

ILLUSTRATED FLORA OF THE PACIFIC STATES

—
LEROY ABRAMS





ILLUSTRATED FLORA



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ILLUSTRATED FLORA

OF THE

PACIFIC STATES

WASHINGTON, OREGON, AND CALIFORNIA

BY

LEROY ABRAMS

IN FOUR VOLUMES

VOL. II

POLYGONACEAE TO KRAMERIACEAE

BUCKWHEATS TO KRAMERIAS

1944

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PREFACE

In the preparation of the text for this volume the author gratefully acknowledges his indebtedness to the following contributors: Roxana Stinchfield Ferris, for the texts of the families Nyctaginaceae and Portulacaceae, also the genus *Descurainia* in the family Brassicaceae; Lyman Benson, for the genus *Ranunculus*; Rimo Bacigalupi, for the Saxifragaceae; and Charles Piper Smith, for the large and difficult genus *Lupinus*. The text of the remaining families was written by the author. In its preparation he is deeply indebted to his colleagues at the Dudley Herbarium of Stanford University: Elmer D. Applegate has furnished many valuable specimens and field notes, especially of plants in southern Oregon. Ira L. Wiggins has been consulted many times on perplexing taxonomic and nomenclatorial problems. Roxana S. Ferris has assisted in the selection of material for illustration, and, together with Helena Barden, has checked the bibliographical references and read the manuscripts and proofs.

As in Volume I all the illustrations in this volume are original, except for those species which are illustrated in Britton and Brown's *Illustrated Flora of the Northern United States and Canada*. Privilege to use figures from this work was granted by the New York Botanical Garden, and is hereby acknowledged with gratitude. Many of the original figures were drawn by Jeanne Russel Janish, but Louise Nash drew the Lupines, and Helen Edwards Bacon, Alice Baldwin Addicott, and William S. Atkinson drew a number of species scattered through various plant families.

Since this work was first projected the cost of printing has about doubled, but the continuance of the work has been assured through the active interest of Chancellor Ray Lyman Wilbur, who has secured funds from private sources to help meet the increased cost of publication.

L. R. A.

STANFORD UNIVERSITY



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APPROXIMATE EQUIVALENTS OF THE METRIC SYSTEM

1 millimeter (mm.) = $\frac{1}{25}$ of an inch.

3 millimeters = $\frac{1}{8}$ of an inch.

1 centimeter (cm.) = $\frac{2}{5}$ of an inch.

5 centimeters = 2 inches.

1 decimeter (dm.) = 4 inches.

1 meter (m.) = 40 inches or $3\frac{1}{2}$ feet.

300 meters = 1000 feet.

ILLUSTRATED FLORA

VOL. II



Family 35. POLYGONACEAE.

BUCKWHEAT FAMILY.

Herbs, shrubs, or rarely vines or trees, with jointed stems. Leaves alternate, opposite or whorled, often only basal, simple and generally entire. Stipules when present united and sheathing. Flowers mostly perfect, on jointed pedicels. Calyx 2-6-parted or -cleft, the sepals or segments persistent, often petaloid. Petals none. Stamens 2-9, inserted near the base of the calyx. Pistil solitary, free from the calyx; ovary superior, 1-celled; ovule solitary, orthotropous, erect or pendulous; styles 2-3 or rarely 4, distinct or partly united. Fruit a lenticular, 3- or rarely 4-angled achene, usually invested by the persistent calyx. Embryo straight within the endosperm or curved around it.

A family of about 30 genera and 850 species, of wide geographic range.

Leaves without stipules, basal, stem leaves when present opposite or alternate. (*Eriogoneae*.)

Flowers subtended by one or several distinct bracts, or sometimes without bracts, never enclosed in an involucre.

Bracts none.

2. *Gilmania*.

Bracts present.

Bracts 2-lobed, 2-saccate on the back, enlarged in fruit.

1. *Pterostegia*.

Bracts not saccate or enlarged in fruit.

Bracts floccose-tomentose; flowers in small head-like clusters.

Calyx glabrous; stamens 3.

3. *Nemacaulis*.

Calyx tomentose; stamens 9.

4. *Hollisteria*.

Bracts glabrous; stamens 3.

5. *Lastarriaea*.

Flowers enclosed in a turbinate or cylindric involucre.

Involucral teeth or lobes spine-tipped.

Involucre mostly 4-5-toothed and the tube generally cylindric or prismatic, commonly 1-flowered; teeth often with uncinat spines.

6. *Chorizanthe*.

Involucre mostly 4-5-lobed, the tube turbinate, never cylindric; teeth never uncinat; flowers several.

7. *Oxytheca*.

Involucral lobes or teeth not spine-tipped.

8. *Eriogonum*.

Leaves with sheathing often scarious stipules, alternate; involucre none.

Calyx 4- or 6-parted or urceolate and 6-lobed, at least in the pistillate flowers. (*Rumiceae*.)

Calyx urceolate, becoming indurate and bur-like in fruit; outer lobes spinescent.

9. *Emex*.

Calyx 4- or 6-parted, the inner cycle erect, the outer reflexed and smaller; flowers perfect or unisexual.

10. *Rumex*.

Sepals 6; leaves not reniform.

11. *Oxyria*.

Sepals 4; leaves reniform.

Calyx 5-parted, equal, often petaloid and erect in fruit; stigma capitate. (*Polygoneae*.)

12. *Polygonum*.

1. PTEROSTÈGIA Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 48. 1835.

Annuals with weak slender dichotomously branched stems and opposite entire or 2-lobed leaves. Involucre axillary, solitary with a single 2-lobed bract, becoming enlarged, scarious and reticulate in fruit. Flowers solitary, sessile, exceeding the involucre. Calyx 6- or rarely 5-parted. Stamens 3 or 6, inserted at the base of the sepals. Achenes loosely enclosed by the involucre, triangular, glabrous; cotyledons rounded, acumbent. [Greek, meaning wing and covering, referring to the involucral bract.]

A monotypic genus of western North America.

1. *Pterostegia drymaroides* Fisch. & Mey. *Pterostegia*. Fig. 1300.

Pterostegia drymaroides Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 48. 1835.

Pterostegia diphylla Nutt. Journ. Acad. Phila. II. 1: 168. 1847.

Pterostegia diphylla var. *biloba* Nutt. loc. cit.

Pterostegia microphylla Nutt. loc. cit.

Stems very slender, decumbent or prostrate, branching from the base, 1-5 dm. long, usually with elongated internodes, thinly hirsute. Lower leaves fan-shaped, 3-15 mm. broad, usually 2-lobed and the lobes often crenately toothed or shallowly lobed, narrowed at base to the petiole,

upper leaves entire or slightly toothed; involucre 2-lobed, 2-3 mm. long in fruit, lacinate-toothed; sepals usually 6, lanceolate, acute, less than 1 mm. long.

Open or shaded slopes, mainly Upper Sonoran Zone; northern California to Lower California, southern Utah, and Arizona. Type locality: Bodega Bay, California. March-July.

2. *GILMANIA* Coville, Journ. Wash. Acad. 26: 210. 1936.

Small prostrate annual with yellowish herbage. Basal leaves petioled, 3-nerved; the cauline 3 at the nodes, and the uppermost sessile. Flowers in fascicles of 5-6 at the nodes, without involucre or bracts, through the shortening of the internodes, the uppermost fascicles becoming congested into leafy-bracted terminal glomerules. Pedicels jointed at the base. Calyx 6-parted, yellow. Stamens 9; filaments filiform. Styles 3, deciduous. Achene triangular; embryo nearly straight; cotyledons orbicular. [Name in honor of M. French Gilman, who rediscovered the species.]

A monotypic genus of the Mojave Desert, California.

1. *Gilmania luteola* Coville. *Gilmania* or Golden Carpet. Fig. 1301.

Phyllogonum luteolum Coville, Contr. U.S. Nat. Herb. 4: 190. 1893.

Eriogonum luteolum M. E. Jones, Contr. West Bot. No. 11: 15. 1903.

Gilmania luteola Coville, Journ. Wash. Acad. 26: 210. 1936.

Stems prostrate, branching, 5-15 cm. long, the nodes often giving rise to several branches, thinly pilose above. Basal leaves and the lower cauline obovate or broadly oblong, 10-15 mm. long, obtuse at apex, narrowed at base to a petiole of about equal length; upper leaves smaller and short-petioled or the uppermost sessile; pedicels 2-5 mm. long; sepals 1.5-2 mm. long, oblong-linear, the inner 3 becoming a little longer in fruit; achene buff-colored, smooth and shining, ellipsoid, 1.5 mm. long.

A local species of the Death Valley region, California. Type locality: Furnace Creek Canyon, Funeral Mountains. March-April.

3. *NEMACAULIS* Nutt. Journ. Acad. Phila. II. 1: 168. 1847.

Slender diffusely branching annuals, with mostly basal exstipulate leaves. Flowers perfect, capitate, each with a free herbaceous bract, the heads sessile at the nodes. Calyx 6-cleft, colored, enclosing the achene. Stamens 3. Styles 3; stigmas capitate. Achene short-ovoid, obscurely 3-angled. [Name Greek, meaning thread and stems, in reference to the very slender branches.]

A monotypic Californian genus.

1. *Nemacaulis denudata* Nutt. *Nemacaulis* or Woolly-heads. Fig. 1302.

Nemacaulis denudata Nutt. Journ. Acad. Phila. II. 1: 168. 1847.

Nemacaulis foliosa Nutt. Journ. Acad. Phila. II. 1: 168. 1847.

Nemacaulis Nuttallii Benth. in DC. Prod. 14: 23. 1857.

Stems branching from the base, prostrate or usually ascending, 4-35 cm. long, glabrate. Basal leaves spatulate, 1.5-5 cm. long, including the short petiole, densely woolly-tomentose on both surfaces; stem leaves, except at the lowermost nodes, reduced to bracts; bractlets of the flower clusters obovate-spatulate, 2 mm. long, the outer flowerless, the inner smaller, woolly within and glabrous without; calyx yellow, glabrous, about 1 mm. long, short-pedicelled.

Sandy soils, Sonoran Zones; along the coast from Los Angeles County, California, to San Jorge, Lower California, also on the western border of the Colorado Desert, California. Type locality: San Diego, California. April-Sept.

4. *HOLLISTÈRIA* S. Wats. Proc. Amer. Acad. 14: 296. 1879.

Diffusely branched prostrate floccose-tomentose annual, leafy throughout. Stem leaves cuspidate, solitary at the nodes but usually with small cuspidate stipules. Involucre solitary and sessile in the axils, composed of 3 slightly united acicular bracts, 2-flowered. Calyx turbinate, membranous, 6-cleft to below the middle. Stamens 6-9, included. Style divided to the base, the lobes recurved. Achenes ovoid, abruptly contracted to a 3-angled beak, longer than the body, shining. Embryo curved; cotyledons accumbent, orbicular. [Name in honor of Col. W. H. Hollister, pioneer Californian.]

A monotypic Californian genus.

1. *Hollisteria lanata* S. Wats. *Hollisteria*. Fig. 1303.

Hollisteria lanata S. Wats. Proc. Amer. Acad. 14: 296. 1879.

Chorizanthe floccosa M. E. Jones, Contr. West Bot. No. 12: 74. 1908.

Prostrate annual, lanate throughout, the main branches 5-20 cm. long. Basal and lowest stem leaves oblanceolate, narrowed at base to the petiole, acute at apex, 25-35 cm. long; stem leaves ovate, sessile, 7-15 mm. long, cuspidate; calyx-lobes rotate-spreading in anthesis, about 2 mm. long, greenish yellow, densely woolly on the outer surface, the outer broadly scarious-margined,

the inner less so; achenes scabrous on the angles of the beak-like apex, otherwise glabrous and shining.

Open hills and plains, Sonoran Zones; plains of the upper San Joaquin Valley and on the adjoining foothills of the southern Sierra Nevada and Inner Coast Ranges, California. Type locality: Hollister Ranch, Cholame Valley, Monterey County, California. April-June.

5. LASTARRIAEA Remy in Gay, Fl. Chil. 5: 289. pl. 58. 1849.

A small diffuse fragile annual. Leaves linear, basal and in whorls at the nodes, the upper reduced to bracts and ending in a hooked awn. Flowers solitary in the axils of the whorl or bracts. Calyx coriaceous, tubular, 5-6-cleft to the middle, the narrow teeth rigid, recurved and uncinatate. Stamens 3, inserted in the calyx throat; filaments very short, with small membranous appendages at their insertions. Achene triangular; embryo curved. [Name in honor of J. V. Lastarria, a Chilean writer of the 19th century.]

A Chilean genus with one or two species.

1. Lastarriaea chilensis Remy. Lastarriaea. Fig. 1304.

Lastarriaea chilensis Remy in Gay, Fl. Chil. 5: 290. pl. 58. 1849.

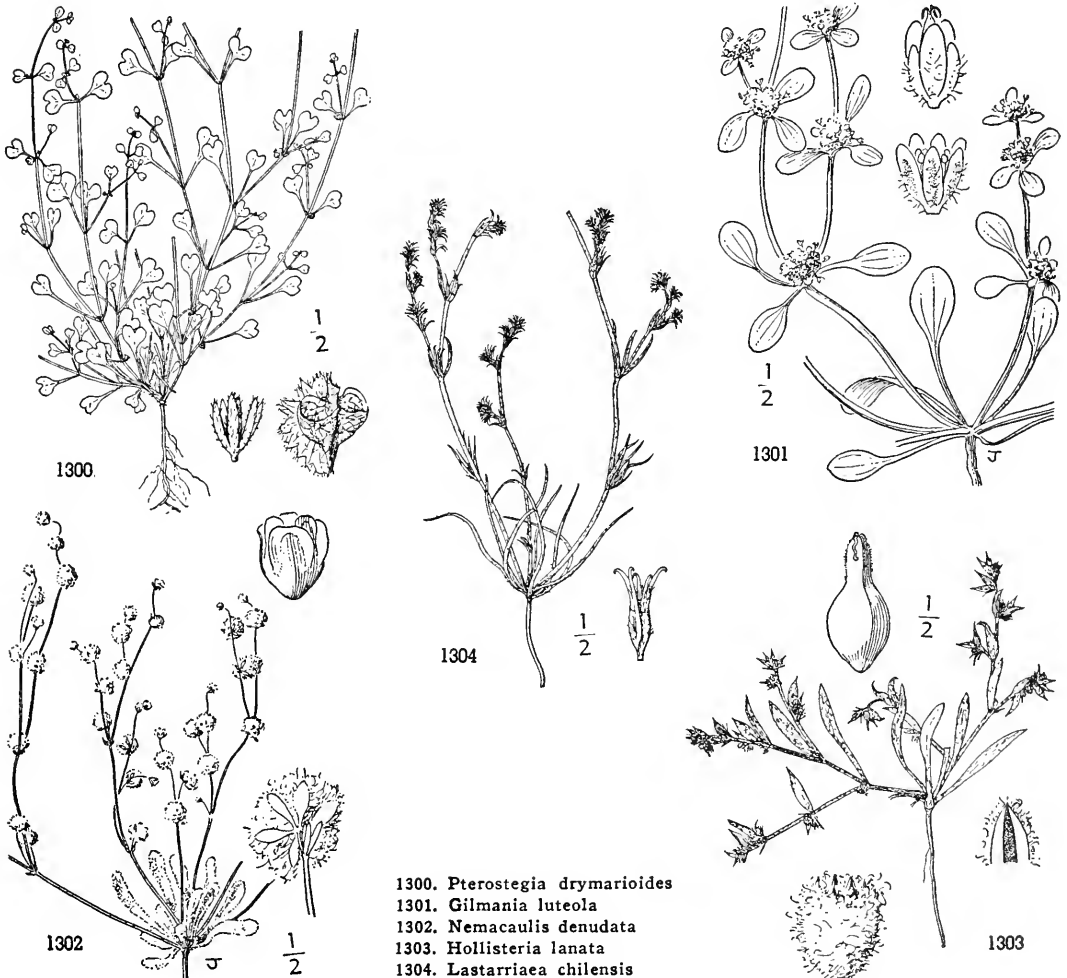
Chorizanthe Lastarriaea Parry, Proc. Davenp. Acad. 4: 63. 1884.

Lastarriaea chilensis subsp. *californica* H. Gross, Bot. Jahrb. 49: 345. 1913.

Chorizanthe Lastarriaea var. *californica* Goodman, Ann. Mo. Bot. Gard. 21: 33. 1934.

Stems branching from the base, the branches procumbent or ascending, 5-15 cm. long, hirsute. Basal leaves linear, obtuse, 1-2 cm. long, hispid-ciliate, the cauline in whorls of 4-5, unequal; bracts 3-6 mm. long concealing the flowers, uncinatate; calyx 2-3 mm. long, the tube triquetrous, 5-toothed, 3 of the teeth long, 2 short; anthers orbicular, small.

Sandy soils, Sonoran Zones; Contra Costa and Mono Counties, California, to Lower California; also Chile from whence it was probably introduced into California. Type locality: Chile. June-Sept.



6. CHORIZANTHE R. Br. ex Benth. Trans. Linn. Soc. 17: 416. pl. 19. 1836.

Low dichotomously branched annual or perennial herbs, with rosulate basal leaves and opposite or ternate stem leaves often reduced and bracteate. Involucres 1-flowered or rarely 2-3-flowered, cylindric or funnelliform, sessile, 3-6-angled or -ribbed, 3-6-toothed, the teeth divaricate, cuspidate or awned. Flowers pedicellate or subsessile, included within the involucre or partly exserted; bractlets wanting; calyx 6-parted or -cleft, usually white or pink. Stamens 9, rarely 3 or 6, adnate to the base of the calyx-tube. Achene glabrous, 3-angled; cotyledons straight or accumbent. [Name Greek, meaning divide and flower in reference to the divided calyx.]

An American genus of about 50 species inhabiting arid southwestern United States, Mexico, and Chile. Most of the South American species are perennial, whereas all of ours are annuals. Type species, *Chorizanthe virgata* Benth.

Bracts entire.

Involucres 6-toothed and 6-ribbed.

Teeth of the involucre not membranous on the margin.

Involucral teeth nearly equal but the outer three often larger than the inner three.

Calyx-lobes entire or erose, but not fimbriate.

Outer and inner calyx-lobes similar or the inner slightly smaller.

Plants erect; joints of the stem very fragile.

Leaves narrowly oblanceolate, 2-3 mm. broad.

1. *C. brevicornu.*

Leaves broadly spatulate, 8-15 mm. broad.

2. *C. spathulata.*

Plants procumbent or ascending; joints of the stem not noticeably fragile.

Involucral teeth uncinat.

Calyx-lobes scarcely exceeding the involucral tube, not apiculate.

Stamens 3.

3. *C. angustifolia.*

Stamens 9.

4. *C. procumbens.*

Calyx-lobes distinctly exserted beyond the involucral tube, and distinctly apiculate.

5. *C. cuspidata.*

Involucral teeth straight.

6. *C. villosa.*

Outer and inner calyx-lobes dissimilar, the inner much shorter and narrower.

Teeth of the involucre uncinat or the tips recurved.

Bracts not foliaceous, or those of the first node rarely so and then early deciduous.

Calyx 4 mm. or less in length, the lobes oblong.

7. *C. staticoides.*

Calyx 4.5-5 mm. long; outer lobes linear.

8. *C. leptotheca.*

Bracts except the floral ones foliaceous, those of the stems and main branches usually similar to the basal leaves.

Calyx 5-6 mm. long.

9. *C. Xantii.*

Calyx 4 mm. or less in length. (See also vigorous forms of *C. staticoides*.)

Foliaceous bracts lanceolate.

Head-like clusters of involucres 10-15 mm. broad.

10. *C. Wheeleri.*

Head-like clusters of involucres less than 10 mm. broad.

11. *C. Parryi.*

Foliaceous bracts mostly broadly ovate or obovate.

12. *C. Breweri.*

Teeth of the involucre straight, not recurved nor uncinat; calyx erose.

Plants decumbent; involucral tube not wrinkled between the ribs, the teeth widely divergent.

11. *C. Parryi fernandina.*

Plants erect; involucral tube transversely wrinkled between the ribs, the teeth erect.

21. *C. valida.*

Calyx-lobes at least the inner three fimbriate.

Outer calyx-lobes entire, the inner fimbriate.

13. *C. Palmeri.*

Outer and inner calyx-lobes all fimbriate.

14. *C. fimbriata.*

Involucral teeth very unequal, the anterior one usually longer than the tube, the other five short.

Elongated anterior tooth straight.

15. *C. uniaristata.*

Elongated anterior tooth uncinat.

16. *C. Clevelandii.*

Teeth of the involucre with membranous often white or colored margins.

Membranous margins not continuous through the sinuses but cleft or parted.

Involucral teeth uncinat or recurved at apex.

Plants decumbent or prostrate; involucres 4 mm. or less in length.

Calyx-lobes erose, the outer obovate or rarely oblong.

17. *C. pungens.*

Calyx-lobes not erose, the outer oblong to lanceolate.

Lobes of the calyx cuspidate.

5. *C. cuspidata.*

Lobes of the calyx entire not cuspidate.

18. *C. diffusa.*

Plants erect; involucres over 4 mm. long.

Involucres hispid, margins white.

19. *C. stellulata.*

Involucres hirsute, margins not white.

20. *C. robusta.*

Involucral teeth straight, not uncinat or recurved.

Calyx 5-6 mm. long; plants erect.

21. *C. valida.*

Calyx 4 mm. long; plants spreading.

22. *C. Howellii.*

Membranous margins continuous through the sinuses.

Margins partly cleft; calyx-lobes bifid.

19. *C. stellulata.*

Margins not at all cleft; calyx-lobes entire.

Leaves alternate on first internode; margins of involucral teeth purple.

23. *C. Douglasii.*

Leaves absent on first internode; margins of involucral teeth light pink.

24. *C. membranacea.*

- Involucres 3-5-toothed, if 6-toothed the tube not 6-ribbed.
 Involucral tube 3-angled or 4-5-ribbed, not corrugated.
 Involucre 4-5-ribbed and 4-5-toothed, one tooth much longer than the others, all tipped with straight spines. 25. *C. spinosa*.
 Involucre 3-angled, not ribbed.
 Involucral teeth uncinatè, equal.
 Involucral teeth 3; bracts seldom foliaceous. 26. *C. Orcuttiana*.
 Involucral teeth 6, the 3 inner minute. 27. *C. polygonoides*.
 Involucral teeth 3, unequal, these and the bracts ending in long straight spines. 28. *C. rigida*.
 Involucral tube cylindric, corrugated but not ribbed.
 Involucral teeth 5, one much larger than the other four, all recurved above; tube obscurely corrugated. 29. *C. Watsonii*.
 Involucral teeth 3, all similar; tube conspicuously corrugated. 30. *C. corrugata*.
 Bracts 3-lobed.
 Involucres not spurred at base; 4-toothed at apex.
 Bracts minute; involucral teeth equal.
 Involucral teeth 4. 31. *C. Vortriedei*.
 Involucral teeth 5. 32. *C. insignis*.
 Bracts conspicuous; involucral teeth unequal.
 Bracts unilateral; involucre not 4-angled. 33. *C. californica*.
 Bracts orbicular-perfoliate; involucre 4-angled. 34. *C. perfoliata*.
 Involucres with 3-6 spurs at base, 5-6-toothed at apex.
 Spurs of the involucre 3, stout and nearly as broad as the tube; involucral teeth straight. 35. *C. Thurberi*.
 Spurs of the involucre 6, slender and spine-like; involucral teeth uncinatè. 36. *C. leptoceras*.

1. *Chorizanthe brevicornu* Torr.

Brittle *Chorizanthe* or Spine-flower. Fig. 1305.

Chorizanthe brevicornu Torr. Bot. Mex. Bound. 177. 1859.

Erect annual herb, 1-2 dm. high, branches ascending, very fragile at the nodes when mature. Leaves oblanceolate, 3-6 cm. long; bracts opposite, the lower bracts foliaceous, lanceolate to oblanceolate, apiculate, the upper reduced; involucre solitary in the axils of the branches of the cymose inflorescence, cylindric, slightly curved, 4 mm. long, 6-toothed, the teeth short, nearly equal, uncinatè; flowers short-pedicelled; calyx 3-4 mm. long, glabrous, the tube slender, lobes similar, linear-oblong, 1 mm. long; stamens 3.

Sandy desert plains and hills, Lower Sonoran Zone; Mono County, California, to northern Lower California, southwestern Utah, and southern Arizona. Type locality: Gila River, Arizona. March-June.

2. *Chorizanthe spathulata* Small.

Spatula-leaved *Chorizanthe* or Spine-flower. Fig. 1306.

Chorizanthe spathulata Small ex Rydb. Bull. Torrey Club 39: 309. 1912.

Erect annual, 10-15 cm. high, much branched from the base, somewhat caulescent with an appressed pubescence, very fragile at the nodes when mature. Leaves basal, 2-5 cm. long, the blades broadly spatulate, rounded at apex, abruptly narrowed below to a winged petiole of equal or greater length, tomentose beneath, green and scantily pubescent above; lower bracts foliaceous, oblanceolate, the upper reduced and acicular; involucre 1-3 in the axils of the loose cyme, narrowly cylindric, 4-5 mm. long, 6-ribbed and 6-toothed, the teeth slender, short, uncinatè, recurved, 3 shorter than the alternating ones; calyx and stamens as in *C. brevicornu*.

Dry sandy or gravelly soils, Upper Sonoran Zone; southern Idaho, western Nevada, and adjacent (Mono and Inyo Counties) California. Type locality: Big Butte Station, Idaho. June-July.

3. *Chorizanthe angustifolia* Nutt.

Narrow-leaved *Chorizanthe* or Spine-flower. Fig. 1307.

Chorizanthe angustifolia Nutt. Journ. Acad. Phila. II. 1: 167. 1848.

Chorizanthe angustifolia var. *Eastwoodiae* Goodman, Ann. Mo. Bot. Gard. 21: 42. 1934.

Plants prostrate or decumbent, branches several from the base, 18-40 cm. long, canescent with appressed-villous pubescence. Leaves basal, oblanceolate to spatulate, long-petioled, 2-5 cm. long; bracts opposite, the lower similar to the basal leaves, the uppermost much reduced and acicular, densely appressed-villous; involucre in scattered head-like cymes, about 3.5 mm. long, the tube cylindric, 3-angled, 6-toothed, the larger teeth about equaling the tube, divergent, straight except the uncinatè tip; calyx scarcely exerted, 2-2.5 mm. long, the lobes oblong, acute to truncate, erose at summit; stamens 9, rarely reduced to 3.

Sandy soils mainly near the coast, Upper Sonoran Zone; Moro Bay, San Luis Obispo County, to San Diego, California. Type locality: "Pueblo los Angeles." April-June.

4. *Chorizanthe procumbens* Nutt.

Prostrate *Chorizanthe* or Spine-flower. Fig. 1308.

Chorizanthe procumbens Nutt. Journ. Acad. Phila. II. 1: 167. 1848.

Chorizanthe uncinata Nutt. Journ. Acad. Phila. II. 1: 167. 1848.

Chorizanthe procumbens var. *albiflora* Goodman, Ann. Mo. Bot. Gard. 21: 87. 1934.

Stems branching from the base, and procumbent or ascending, 3-15 cm. long, strigose-tomentulose. Leaves oblanceolate, 2-7 cm. long, slender-petioled, woolly-tomentose, glabrate above;

lower bracts similar to the leaves, the floral ones acicular; involucre axillary and in small terminal clusters, the tube 2 mm. long, 6-ribbed, pubescent to nearly glabrous; teeth spreading and their tips curved or uncinat, the 3 outer slightly exceeding the tube, the inner 3 scarcely as long; calyx yellow rarely white, 1.5–2 mm. long, partly exserted, the lobes oblong, much shorter than the tube, scantily appressed-puberulent.

Sandy or gravelly mesas and washes, Upper and Lower Sonoran Zones; cismontane southern California from the interior valleys of Los Angeles and San Bernardino Counties to coastal San Diego County and adjacent Lower California. Type locality: San Diego, California. April–June.

5. *Chorizanthe cuspidata* S. Wats.

San Francisco *Chorizanthe* or Spine-flower. Fig. 1309.

Chorizanthe cuspidata S. Wats. Proc. Amer. Acad. 17: 379. 1882.

Chorizanthe pungens var. *cuspidata* Parry, Proc. Davenp. Acad. 4: 60. 1884.

Prostrate or decumbent annuals, the branches 10–25 cm. long, villous. Leaves basal, oblanceolate, 2–3.5 cm. long, long-petioled; bracts opposite, the lower foliaceous, similar to the basal leaves, the uppermost acicular; involucre in head-like clusters, campanulate, more or less urceolate in age, 2 mm. high, short villous-pubescent, 6-toothed, the teeth divergent, uncinat, the alternating larger, membranous margin wanting or obscure; calyx partly exserted, outer lobes oblong, half as long as the tube, inner narrower, all entire and cuspidate at apex; stamens 9.

Sandy soils mainly near the coast; Sonoma County to Santa Cruz County, California. Type locality: San Francisco, California. May–July.

Chorizanthe cuspidata var. *marginata* Goodman, Ann. Mo. Bot. Gard. 21: 40. 1934. Similar to the typical species in general habit, but plants larger and stems more ascending, and the involucre teeth with an evident membranous margin, thereby simulating *Chorizanthe pungens*. San Francisco and San Mateo Counties, California.

6. *Chorizanthe villòsa* Eastw.

Bodega *Chorizanthe* or Spine-flower. Fig. 1310.

Chorizanthe villosa Eastw. Bull. Torrey Club 30: 485. 1903.

Stems prostrate or decumbent, branched from the base, 1–4 dm. long, canescent-villous. Leaves basal, 3–5 cm. long, oblanceolate, long-petioled, villous; bracts opposite, all but the uppermost foliaceous and similar to the basal leaves, uppermost reduced and spine-tipped; involucre in scattered cymose clusters, the tube 3-angled, 2.5 mm. long, densely villous with ascending hairs, 6-toothed, the teeth divergent, straight not uncinat, yellowish, without marginal membrane; calyx with only apex exserted, 3 mm. long; lobes oblong, obtuse, mucronate, villous-pubescent; stamens 9.

Sandy soil along the coast, Humid Transition Zone; Sonoma and Marin Counties, California. Type locality: Bodega Point, Sonoma County, California. May–July.

7. *Chorizanthe staticoides* Benth.

Statice *Chorizanthe*, Turkish Rugging. Fig. 1311.

Chorizanthe staticoides Benth. Trans Linn. Soc. 17: 418. 1836.

Chorizanthe discolor Nutt. Journ. Acad. Phila. II. 1: 167. 1848.

Stems mostly simple below and erect, diffusely branched above, 10–30 cm. high, usually reddish purple, appressed-pubescent with curved hairs. Leaves basal, 2–6 cm. long, spatulate-oblanceolate, slender-petioled, rounded or emarginate at apex, tomentose beneath, sparsely appressed-pubescent above; bracts all acicular or those of the first node rarely foliaceous; inflorescence a compound more or less diffusely branched flat-topped cyme; involucre numerous, cylindric or cylindric-urceolate, 3.5–4 mm. long or those in the lower forks longer, appressed-pubescent or somewhat tomentose, 6-toothed, 3 outer much larger than the inner, spreading, uncinat; calyx 4–5 mm. long, partly exserted, rose-colored, pubescent, the lobes narrowly oblong, obtuse and entire.

Sandy or gravelly slopes, mainly Upper Sonoran Zone; Monterey and Kern Counties to cismontane southern California as far south as Orange County. Type locality: California (Douglas). April–June.

Chorizanthe staticoides var. *latilòba* Goodman, Ann. Mo. Bot. Gard. 21: 57. 1934. Inhabits the desert slopes of the San Gabriel Mountains, southern California, and is characterized by the obovate, truncate calyx-lobes.

Chorizanthe chrysacantha Goodman, Ann. Mo. Bot. Gard. 21: 58. 1934. Plants generally stouter; bracts of the first node foliaceous; involucre 4–4.5 mm. long; calyx 5–5.5 mm. long. Probably only a robust coastal form of *C. staticoides*.

8. *Chorizanthe leptotheca* Goodman.

Ramona *Chorizanthe* or Spine-flower. Fig. 1312.

Chorizanthe leptotheca Goodman, Ann. Mo. Bot. Gard. 21: 61. 1934.

Stems erect, the smaller simple below, the larger diffusely branched, 6–20 cm. high, sparsely tomentulose, usually reddish. Leaves basal, 2–4 cm. long, the blades round-obovate to oblanceolate, tomentose beneath, villous-pubescent above, abruptly narrowed to an elongated slender petiole; lower bracts foliaceous, the upper acicular; involucre solitary in the lower axils, and in small dense clusters above forming a loose cyme, slender, 4 mm. long, thinly tomentulose, 6-toothed, the teeth spreading and uncinat, 3 inner much smaller than the alternating outer ones; calyx well exserted, 4.5–5 mm. long, outer lobes linear, obtuse, the inner narrower and about half as long; stamens 9.

Dry sandy or gravelly soils, Upper and Lower Sonoran Zones; interior valleys and foothills of cismontane southern California, western Riverside County to northern Lower California. Type locality: dry hills between Ramona and Ballena, San Diego County, California. May–July.

9. *Chorizanthe Xántii* S. Wats.Xantus' *Chorizanthe* or Spine-flower. Fig. 1313.*Chorizanthe Xántii* S. Wats. Proc. Amer. Acad. 12: 272. 1877.

Stems erect, simple below or branching from the base, 5–25 cm. high, with an appressed pubescence, sometimes sparsely so. Leaves basal, 2–5 cm. long, long-petioled, the blades oblong-ovate to oblong-oblancoate, tomentose beneath, villous above and on the slender petioles; lower bracts foliaceous, similar to the leaves, the floral ones acicular; involucre solitary in axils or in small clusters forming a rather flat-topped cyme, the tube 4–4.5 mm. long, narrowly cylindric, canescent, teeth 6, widely divergent, uncinat, 3 outer larger than the inner ones; calyx 5–6 mm. long, white or rose-colored, outer lobes 2 mm. long, oblong or elliptic, the inner a little shorter and narrower; stamens 9.

Dry ridges and flats, mainly Upper Sonoran Zone; southern San Luis Obispo, Kern and Inyo Counties south mostly through the desert regions to Cajon Pass, San Bernardino County, California. Type locality: near Fort Tejon, Kern County, California. April–June.

Chorizanthe Xántii var. *leucotheca* Goodman, Ann. Mo. Bot. Gard. 21: 60. 1934. Plants lower, 5–10 cm. high; involucre densely white-tomentose. Sandy mesas, Lower Sonoran Zone; western Colorado Desert, Riverside County, California.

10. *Chorizanthe Wheeleri* S. Wats.Wheeler's *Chorizanthe* or Spine-flower. Fig. 1314.*Chorizanthe Wheeleri* S. Wats. Proc. Amer. Acad. 12: 272. 1877.*Chorizanthe insularis* Hoffmann, Bull. S. Calif. Acad. 31: 56. 1932.

Stems simple or branched from the base, erect or spreading, frequently trichotomously branched at first node, 6–20 cm. high, rather densely cinereous-pubescent. Leaves basal, 2–3 cm. long, the blades ovate-spatulate to oblong, hoary-tomentose beneath, abruptly narrowed to a slender elongated petiole; lower bracts often in a verticil at first node, foliaceous and similar to the leaves, the floral ones acicular and opposite; cymes terminal on the branches, closely congested; involucre becoming reddish, cylindric, 2.5–3 mm. long, sparsely tomentose or glabrate, 6-toothed, the teeth short, widely spreading, uncinat; calyx 3–3.5 mm. long, the outer lobes oblong-elliptic to lanceolate, obtuse, the inner a little smaller and narrower; stamens 6.

Dry gravelly or sandy ridges, Upper Sonoran Zone; along the coast of Santa Barbara and Los Angeles Counties and on Santa Cruz and Santa Rosa Islands, California. Type locality: Santa Barbara, California. April–June.

11. *Chorizanthe Parryi* S. Wats.Parry's *Chorizanthe* or Spine-flower. Fig. 1315.*Chorizanthe Parryi* S. Wats. Proc. Amer. Acad. 12: 271. 1877.

Plants diffusely branched, decumbent or ascending, 4–30 cm. long, appressed-pubescent. Leaves basal, oblanceolate, 2–7 cm. long, narrowed to the petiole, more or less appressed-pubescent; lower bracts similar to the leaves but more distinctly mucronate, the floral ones acicular; involucre in small numerous clusters forming a loose cyme, the tube 6-ribbed, urceolate, 3 mm. long, canescent with appressed hairs; outer teeth widely spreading, about as long as the tube, more or less uncinat, the inner 3 much reduced, uncinat; calyx-lobes spreading, the outer oblong-obovate to oblong, obtuse, erose, the inner linear-lanceolate.

Dry sandy plains and washes, Upper and Lower Sonoran Zones; interior valleys of cismontane southern California, Los Angeles and San Bernardino Counties to San Diego County. Type locality: Crofton, San Bernardino County, California. April–June.

Chorizanthe Parryi var. *fernandina* (S. Wats.) Jepson, Man. Fl. Pl. Calif. 298. 1923. (*Chorizanthe fernandina* S. Wats.) Outer involucre teeth widely divergent but straight not recurved nor uncinat, the inner also straight and very much reduced. Nearer the coast than the typical species and extends from San Fernando Valley and coastal valleys of Los Angeles County to Orange County, California.

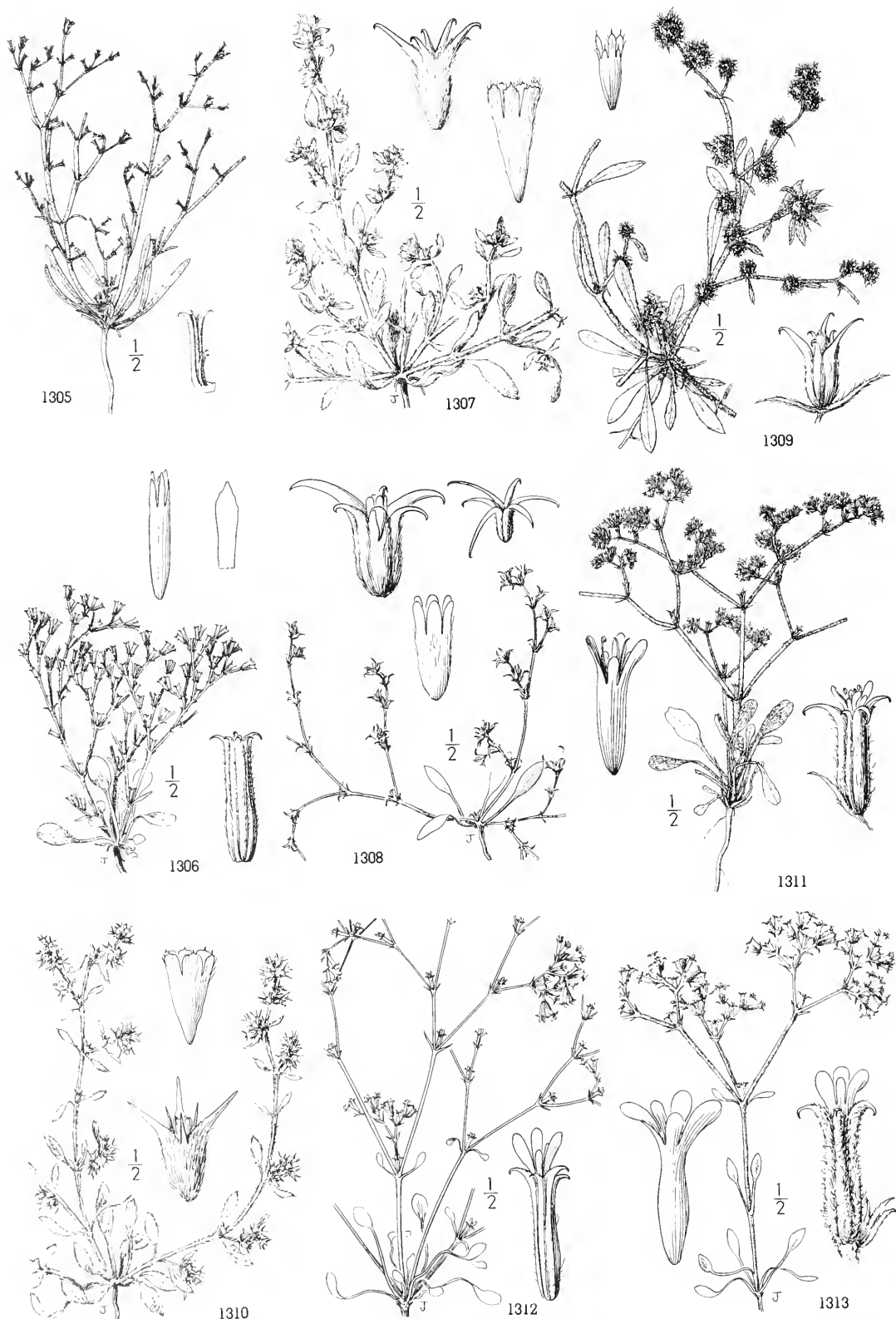
12. *Chorizanthe Brèweri* S. Wats.Brewer's *Chorizanthe* or Spine-flower. Fig. 1316.*Chorizanthe Brèweri* S. Wats. Proc. Amer. Acad. 12: 270. 1877.

Stems ascending to decumbent, branching from or near the base, 6–15 cm. long, cinereous with a short appressed pubescence. Leaves basal, pubescent with upwardly curved hairs, long-petioled, the blades spatulate to ovate, 6–12 mm. long; lower bracts foliaceous, similar to the leaves, the upper acicular; involucre in small dense rather distinct cymes, cylindric, 3–4 mm. long, short-tomentose and reddish; teeth spreading, uncinat, the 3 inner shorter than the alternating outer ones; calyx 3–3.5 mm. long, partly exserted, outer lobes elliptic to obovate-oblong, the inner broadly ovate, shorter; stamens 9.

Dry rocky (mostly serpentine outcrops) hillsides, Upper Sonoran Zone; San Luis Obispo County, from vicinity of Atascadero to San Luis Obispo, California. Type locality: dry rocky hillsides, San Luis Obispo. April–June.

13. *Chorizanthe Palmeri* S. Wats.Palmer's *Chorizanthe* or Spine-flower. Fig. 1317.*Chorizanthe Palmeri* S. Wats. Proc. Amer. Acad. 12: 271. 1877.

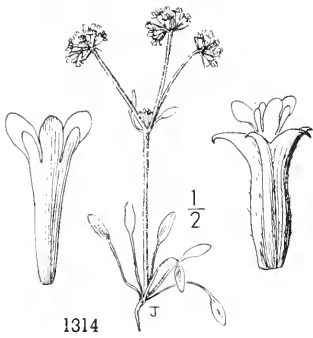
Stems erect, mostly simple at base, dichotomously branched above, 8–20 cm. high, more or less cinereous with a short tomentose pubescence. Leaves basal or nearly so, 3–4 cm. long, the blades oblanceolate, narrowed to a petiole of about equal length; cauline bracts when present verticillate



1305. *Chorizanthe brevicornu*
 1306. *Chorizanthe spathulata*
 1307. *Chorizanthe angustifolia*

1308. *Chorizanthe procumbens*
 1309. *Chorizanthe cuspidata*
 1310. *Chorizanthe villosa*

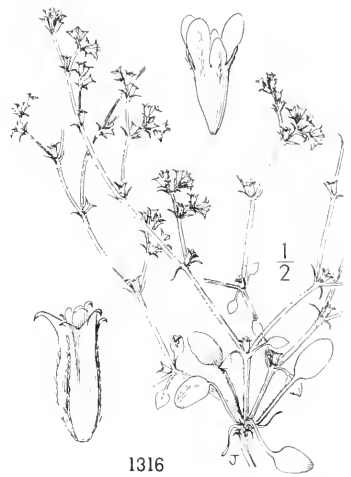
1311. *Chorizanthe staticoides*
 1312. *Chorizanthe leptotheca*
 1313. *Chorizanthe Xantii*



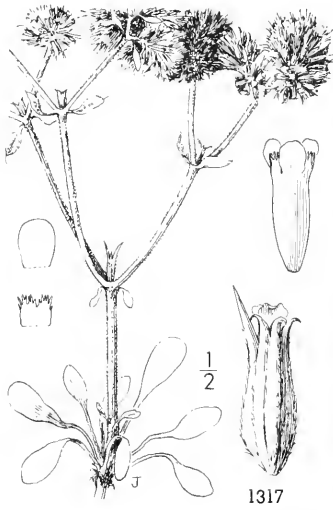
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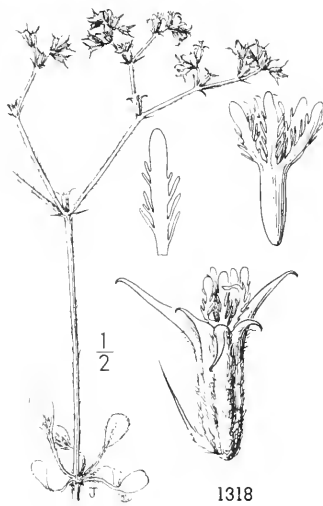
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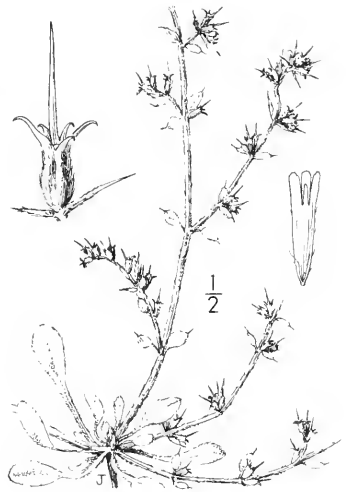
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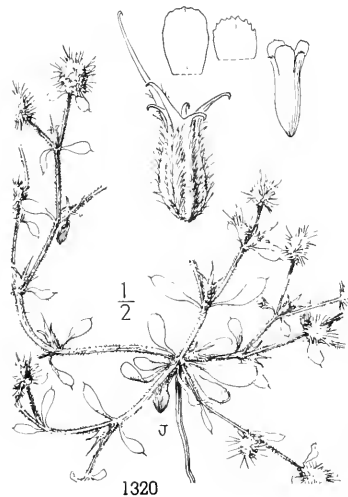
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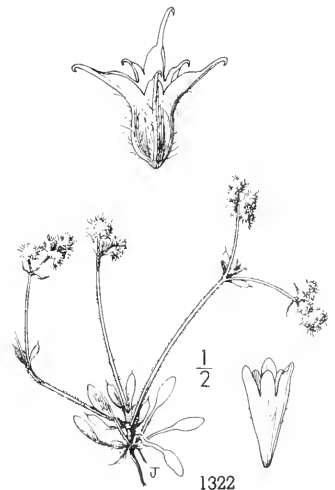
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1314. *Chorizanthe Wheeleri*
 1315. *Chorizanthe Parryi*
 1316. *Chorizanthe Breweri*

1317. *Chorizanthe Palmeri*
 1318. *Chorizanthe fimbriata*
 1319. *Chorizanthe uniaristata*

1320. *Chorizanthe Clevelandii*
 1321. *Chorizanthe pungens*
 1322. *Chorizanthe diffusa*

and similar to the leaves, those subtending the inflorescence foliaceous but shorter and awn-tipped; cymes dense; involucre 4.5–5 mm. long, cinereous-pubescent, 5 of the teeth slightly divergent and uncinat, short, the anterior straight or obscurely uncinat, often about twice as long; calyx little exserted, outer calyx-lobes suborbicular, entire, the inner smaller and fimbriate.

Dry hillsides and over-grazed ranges, Upper Sonoran Zone; California South Coast Ranges, San Benito County to Santa Barbara County. Type locality: San Luis Obispo, California. June–Aug.

Two segregates of doubtful specific or subspecific value have been proposed recently: *Chorizanthe obovata* Goodman (Ann. Mo. Bot. Gard. 21: 70. 1934), with outer calyx-lobes obovate and entire, and *Chorizanthe biloba* Goodman (Ann. Mo. Bot. Gard. 21: 73. 1934), with outer calyx-lobes obovate and more or less 2-lobed.

14. *Chorizanthe fimbriata* Nutt.

Fringed *Chorizanthe* or Spine-flower. Fig. 1318.

Chorizanthe fimbriata Nutt. Journ. Acad. Phila. II. 1: 168. 1848.

Stems erect, solitary or few from the base, 7–30 cm. high, dichotomously branched above or often trichotomous at the first node, reddish, thinly pubescent. Leaves basal, 2.5–4 cm. long, long-petioled, the blades obovate-spatulate, rounded to emarginate at apex, villous-tomentose beneath; bracts all acicular or those of the first node rarely foliaceous; inflorescence a broad open cyme; involucre in small clusters, 5–6 mm. high, cylindric, 4–5 mm. long, mostly thinly pubescent, teeth widely spreading, the 3 inner much smaller, all uncinat; calyx 5–7 mm. long, the lobes about as long as the tube, their margins fimbriate except for the linear entire terminal lobe; stamens 9.

Dry gravelly or sandy mesas and hillsides, Upper and Lower Sonoran Zones; cismontane southern California from Los Angeles County to San Diego County and south to adjacent Lower California. Type locality: San Diego. May–July.

Chorizanthe fimbriata var. *laciniata* (Torr.) Jepson, Fl. Calif. 394. 1914. (*Chorizanthe laciniata* Torr.) Like the typical species in habit, but plants more pubescent, and involucre often densely tomentose; calyx-lobes lacinate, finely fimbriate throughout, the terminal lobes scarcely broader. San Jacinto Mountains to the Laguna Mountains, mainly on the desert slopes, southern California, also adjacent Lower California.

15. *Chorizanthe uniaristata* Torr. & Gray.

One-awned *Chorizanthe* or Spine-flower. Fig. 1319.

Chorizanthe uniaristata Torr. & Gray, Proc. Amer. Acad. 8: 195. 1870.

Chorizanthe rectispina Goodman, Ann. Mo. Gard. 21: 72. 1934.

Stems usually several from the base, decumbent, 10–25 cm. long, cinereous-tomentose. Leaves basal, 2–4 cm. long, oblanceolate, long-petioled, villous-tomentose; bracts foliaceous, awn-tipped, the floral ones acicular; involucre in small head-like cymes racemously or paniculately arranged along the main branches, the tube cylindric-urceolate, 2–3 mm. long, 5 of the teeth short, widely spreading, recurved and uncinat, the anterior one divergent or erect, straight, equaling or much longer than the tube; calyx sparsely pubescent, outer lobes linear-oblong or linear-oblanceolate, obscurely erose at apex, the inner about half the size, linear; stamens 3.

Dry soils, Upper and Lower Sonoran Zones; South Coast Ranges, San Benito, Fresno, and Monterey Counties; also on the plains of upper San Joaquin Valley and Sierra Nevada foothills, Kern County, California. Type locality: New Idria, San Benito County, California. June–Aug.

16. *Chorizanthe Clevelandii* Parry.

Cleveland's *Chorizanthe* or Spine-flower. Fig. 1320.

Chorizanthe Clevelandii Parry, Proc. Davenport Acad. 8: 195. 1870.

Stems usually several from the base, decumbent, 8–20 cm. long, loosely tomentose. Leaves basal, 1–3 cm. long, oblanceolate, obtuse, cinereous-pubescent; lower bracts foliaceous, awn-tipped, those of the inflorescence acicular; involucre in scattered head-like cymes, the tubes hoary-pubescent, urceolate, 3–3.5 mm. long; teeth all uncinat, the anterior one longer than the others and frequently as long as the tube; calyx appressed-pubescent, outer lobes ovate, minutely erose, the inner shorter and conspicuously erose; stamens 3.

Dry rocky or sandy soils, Upper Sonoran Zone; California Coast Ranges, from southern Mendocino and Lake Counties to Ventura County; also southern Sierra Nevada in Tulare and Kern Counties, California. Type locality: Allen's Springs, Lake County, California. June–Aug.

17. *Chorizanthe pungens* Benth.

Monterey *Chorizanthe* or Spine-flower. Fig. 1321.

Chorizanthe pungens Benth. Trans. Linn. Soc. 17: 419. pl. 19. f. 2. 1836.

Chorizanthe Douglasii var. *albens* Parry, Proc. Davenport Acad. 5: 175. 1889.

Stems prostrate or ascending, branching from the base, 8–35 cm. long, canescent with a spreading villous pubescence. Leaves basal, oblanceolate, 3–5 cm. long, long-petioled; bracts opposite, the lower similar to the basal leaves, uppermost acicular; involucre clustered in scattered head-like cymes, the tube cylindric-campanulate, 2–3 mm. long, villous-hirsute, 6-toothed, the alternate teeth larger, divergent, straight except the uncinat tip, winged below with a broad, pale membranous margin separated in the sinuses; calyx 3–3.5 mm. long, partly exserted, lobes about half as long as the tube, erose, the outer 3 obovate or oblong, rounded to truncate occasionally mucronulate at apex, the inner similar but a little narrower and shorter; stamens 9.

Sandy soils, near the coast, mainly Humid Transition Zone; northern Monterey County, California. Type locality: Monterey, California. April–June.

Chorizanthe pungens var. *Hartwegii* (Benth.) Goodman, Ann. Mo. Bot. Gard. 21: 37. 1934. (*Chorizanthe Douglasii* var. *Hartwegii* Benth.) Densely and more or less hoary-villous-pubescent; involucre and calyx often reddish. Sandy bluffs and hills, in the Santa Cruz Mountains about Ben Lomond and Felton, California.

18. *Chorizanthe diffusa* Benth.Diffuse *Chorizanthe* or Spine-flower. Fig. 1322.*Chorizanthe diffusa* Benth. Pl. Hartw. 333. 1857.*Chorizanthe pungens* var. *diffusa* Parry, Proc. Davenp. Acad. 4: 60. 1884.*Chorizanthe pungens* var. *nivea* Curran, Bull. Calif. Acad. 1: 294. 1885.*Chorizanthe Andersonii* Parry, Proc. Davenp. Acad. 5: 175. 1889.*Chorizanthe nivea* Jepson, Man. Fl. Pl. Calif. 297. 1923.

Stems ascending or decumbent, one to several from the base, 6–25 cm. long, rather thinly villous-pubescent. Leaves basal, 2–4 cm. long, oblanceolate, petioled, villous-tomentose beneath, thinly so above; bracts opposite, those of the lower nodes foliaceous but spine-tipped, the upper reduced and acicular; involucre in small cymose clusters, mainly terminal, the tube 3-angled, about 2 mm. long, villous-hirsute, 6-toothed, 3 outer teeth larger, all divergent, uncinately-tipped, and with a conspicuous white membranous margin parted at the sinuses; calyx partly exserted, 2.5 mm. long, the lobes oblong, acutish, entire; stamens 9.

Sandy and gravelly soils, mainly Upper Sonoran Zone; San Mateo County to Santa Barbara County, California. Type locality: dry sandy places, Monterey, California. April–June.

19. *Chorizanthe stellulata* Benth.Starlet *Chorizanthe* or Spine-flower. Fig. 1323.*Chorizanthe stellulata* Benth. Pl. Hartw. 333. 1857.

Stems erect, simple up to the umbellate-branched inflorescence, hirsute-tomentose. Leaves basal, linear-oblanceolate, slightly narrowed below to the winged petiole, 1–2 cm. long, sparsely hispid-hirsute; cauline bracts opposite or verticillate, foliaceous and similar to the basal leaves; floral bracts acicular, hispid; cymes head-like and solitary or several in a terminal compound umbel; involucre cylindric-urceolate, 4 mm. long, 6-ribbed, transversely wrinkled between the ribs, the teeth nearly equal, horizontally spreading, the membranous margin broad, white or purplish, partly cleft but continuous through the sinuses, the apex slender, more or less uncinately; calyx pale yellow, 4–4.5 mm. long, the outer lobes broadly obovate, more or less bilobed; stamens 9.

Dry soils, Upper Sonoran Zone; foothills of Sierra Nevada and North Coast Ranges, Shasta County to Lake and Tulare Counties, California. Type locality: "Valley of the Sacramento," Hartweg. May–June.

20. *Chorizanthe robusta* Parry.Robust *Chorizanthe* or Spine-flower. Fig. 1324.*Chorizanthe robusta* Parry, Proc. Davenp. Acad. 5: 176. 1889.*Chorizanthe pungens* var. *robusta* Jepson, Fl. Calif. 1: 392. 1914.

Plants erect or ascending, 1–5 dm. high, simple below or branched from the base, the branches spreading, villous-hirsute. Leaves basal or sub-basal, 3–8 cm. long, oblanceolate, long-petioled, hirsute-villous, bracts opposite or verticillate, the lower similar to the leaves, the upper apiculate and the uppermost acicular; involucre in large dense cymose clusters, the tube cylindric, 3.5–4 mm. long, 6-toothed, the teeth somewhat divergent, the 3 outer ones slightly larger, straight or more or less uncinately, membranous-margined; calyx included or slightly exserted, 3–4 mm. long, the lobes oblong-elliptic, rounded and erose at apex; stamens 9.

Mostly in sandy soils, Upper Sonoran Zone; San Francisco Bay region to Monterey and Salinas Valley, California. Type locality: dry sandy soil, margins of Monterey Bay north of Aptos, Santa Cruz County, California. May–Sept.

21. *Chorizanthe válida* S. Wats.Sonoma *Chorizanthe* or Spine-flower. Fig. 1325.*Chorizanthe válida* S. Wats. Proc. Amer. Acad. 12: 271. 1877.

Plants erect, simple below, mostly few-branched above, 6–30 cm. high, rather thinly villous. Leaves basal or sub-basal, broadly oblanceolate or spatulate, 3–6 cm. long, long-petioled, villous beneath, sparsely so above; bracts foliaceous, similar to the basal leaves, the uppermost reduced and spinose-tipped; involucre in large dense head-like leafy-bracted cymes; tube 4 mm. long, finely transversely corrugated, glabrate except for ascending hairs on the ribs, 6-toothed, the teeth erect or only slightly divergent, the spines straight not uncinately, stramineous; calyx 5–6 mm. long, outer lobes oblong, truncate, conspicuously erose, the inner narrower; stamens 9.

Sandy soils, Humid Transition Zone; along the coast of Sonoma County to Point Reyes, Marin County, California. Type locality: "Russian Colony," Sonoma County, California. June–Aug.

22. *Chorizanthe Howellii* Goodman.Howell's *Chorizanthe* or Spine-flower. Fig. 1326.*Chorizanthe Howellii* Goodman, Ann. Mo. Bot. Gard. 21: 44. pl. 3. f. 1. 1934.

Branching from the base, the branches prostrate or decumbent, 1–2 dm. long, villous with ascending hairs. Leaves basal, spatulate to broadly obovate, 3–5 cm. long, villous-hirsute beneath, sparsely so above; bracts similar to the leaves, opposite; involucre in dense clusters, 5–6 mm. long, the tube subcylindric, the teeth spreading, the 3 alternate a little shorter, tipped with straight spines, the membranous margin parted at the sinuses; calyx 4 mm. long, slightly exserted, the lobes oblong, truncate and denticulate at apex; stamens 9.

Sand dunes, Humid Transition Zone; coast of Mendocino County, California. Type locality: sand dunes on Mendocino coastal plain, Fort Bragg, California. June–Aug.

23. *Chorizanthe Douglasii* Benth.

Douglas' Chorizanthe or Spine-flower. Fig. 1327.

Chorizanthe Douglasii Benth. Trans. Linn. Soc. 17: 418. 1836.*Chorizanthe Nortonii* Greene, Pittonia 2: 164. 1891.

Stems erect, usually simple below and dichotomously branched above, 10–30 cm. high, villous-tomentose. Leaves basal, 2–5 cm. long, short-villous with ascending hairs, petioles about as long as the blades; bracts foliaceous, similar to the leaves but shorter-petioled, the lowest verticillate, the upper opposite, the floral ones narrowly acicular; cymes reddish purple, head-like, terminating the dichotomous branches; involucre tube 3 mm. long, hirsute, 6-toothed, the teeth shorter than the tube, spreading, delicately uncinat, broadly membranous-margined to the summit, the membranes purplish and continuous through the sinuses; calyx 3.5 mm. high, outer lobes obovate to oblong, truncate or retuse, denticulate and apiculate at apex, the inner a little shorter and emarginate; stamens 9.

Gravelly or sandy slopes, Upper Sonoran Zone; southern Coast Ranges from San Benito and Monterey Counties to San Luis Obispo County, California. Type locality: California. April–June.

24. *Chorizanthe membranacea* Benth.

Pink Chorizanthe or Spine-flower. Fig. 1328.

Chorizanthe membranacea Benth. Trans. Linn. Soc. 17: 419. pl. 17. f. 11. 1836.*Eriogonella membranacea* Goodman, Ann. Mo. Bot. Gard. 21: 91. 1934.

Stems erect, simple below and with few ascending branches above, 10–40 cm. high, floccose-tomentose. Leaves basal and scattered alternately on the first internode, linear or linear-oblancoolate, 3–6 cm. long, loosely tomentose below, scantily arachnoid above; bracts foliaceous, verticillate or opposite, similar to the leaves but shorter, cuspidate; involucre in head-like clusters terminating the branches, tomentose, 4–5 mm. long, the tube 3-angled, contracted in the middle, the teeth slender, nearly equal, uncinat, united to near the apex by a broad, pale rose-colored membranous margin; calyx tomentose, deeply parted, the lobes obovate, the inner narrower.

Dry rocky slopes, Upper Sonoran Zone; Mendocino and Trinity Counties to Santa Barbara County in the Coast Ranges, and Kern County in the Sierra Nevada, California. Type locality: California (Douglas). April–July.

25. *Chorizanthe spinosa* S. Wats.

Spiny Chorizanthe or Mojave Spiny-herb. Fig. 1329.

Chorizanthe spinosa S. Wats. Bot. Calif. 2: 281. 1880.*Eriogonella spinosa* Goodman, Ann. Mo. Bot. Gard. 21: 91. 1934.

Stems prostrate, loosely branched from the base, 5–25 cm. long. Leaves basal, 2–3 cm. long, the blades oblong to broadly obovate, shorter than the petioles, densely woolly-tomentose beneath, villous above and on the petioles; bracts in whorls of 3, slightly connate at base, lanceolate, spine-tipped and rigid, the floral subulate-acicular; involucre in small axillary clusters, 3–4 mm. long, canescent, 4–5-toothed, the teeth with straight spine tips, very unequal with one much longer than the others; calyx white, well exerted, the lobes spreading, the 3 outer ones nearly orbicular, entire, the 3 inner much smaller; stamens 9.

Dry sandy or gravelly soils, Lower Sonoran Zone; western part of Mojave Desert, from Mojave to Red Rock, Kramer and Rabbit Springs, California. Type locality: "near San Bernardino," California. April–July.

26. *Chorizanthe Orcuttiana* Parry.

Orcutt's Chorizanthe or Spine-flower. Fig. 1330.

Chorizanthe Orcuttiana Parry, Proc. Davenport Acad. 4: 54. 1884.

Branched from the base and prostrate, the branches 3–7 cm. long, villous-pubescent with appressed or somewhat spreading hairs. Leaves basal, 1–4 cm. long, narrowly oblanceolate, the petiole as long or longer than the blade, villous-tomentose; lower bracts opposite, foliaceous, oblanceolate, the upper reduced and acicular; involucre generally solitary in the axils of the cymes; the tube about 2 mm. long, 3-angled, 3-toothed, the teeth nearly as long as the tube, recurved, uncinat; calyx cylindric, 2–2.5 mm. long, the lobes erect, linear-lanceolate, short-villous; stamens 9.

A unique and restricted species, known only from Point Loma and Kearney Mesa, San Diego County, California. Type locality: Point Loma, California. March–May.

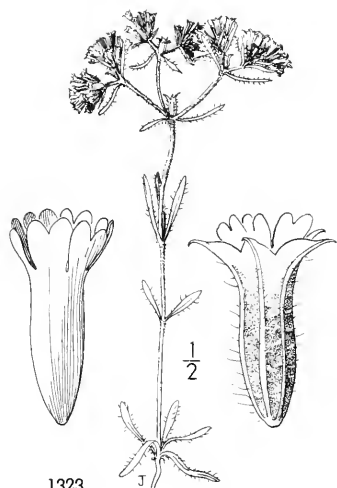
27. *Chorizanthe polygonoides* Torr. & Gray.

Knotweed Chorizanthe or Spine-flower. Fig. 1331.

Chorizanthe polygonoides Torr. & Gray, Proc. Amer. Acad. 8: 197. 1870.*Acanthogonum polygonoides* Goodman, Ann. Mo. Bot. Gard. 21: 91. 1934.

Stems prostrate, dichotomously branched from the base, 5–15 cm. long, sparsely villous-tomentose. Leaves basal, oblanceolate, sparsely hirsute, 3–5 cm. long, the petioles much longer than the blades; bracts opposite, the lower simulating the basal leaves, mostly spatulate, the upper becoming smaller and shorter-petioled, floral ones acicular; involucre in small clusters or solitary in the axils, the tube 2.5 mm. long, obpyramidal, sharply 3-angled, transversely wrinkled, 3 outer teeth as long as the tube, divergent, uncinat, the sides closely folded together, the inner minute; calyx-lobes erect, only the tips exerted; stamens 9; cotyledons orbicular, accumbent.

Dry sandy or gravelly soils, infrequent but of wide distribution. Sonoran Zones; Modoc and Lake Counties to San Diego County, California. Type locality: Reservoir Hill, Placerville, California. April–July.



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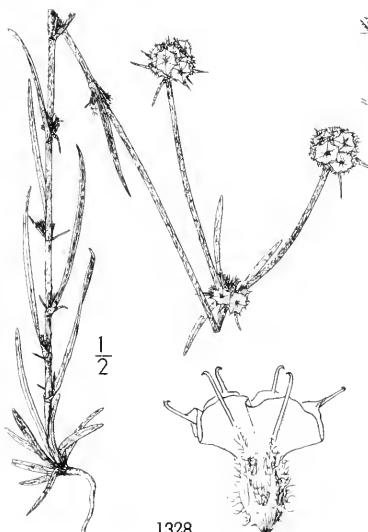
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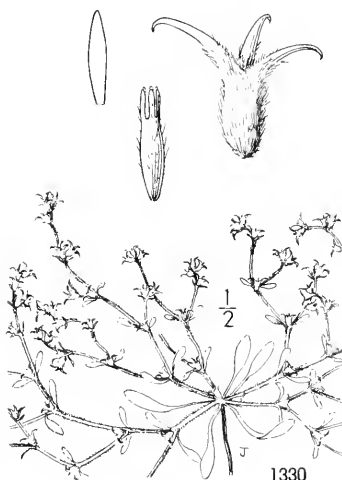
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1323. *Chorizanthe stellulata*1324. *Chorizanthe robusta*1325. *Chorizanthe valida*1326. *Chorizanthe Howellii*1327. *Chorizanthe Douglasii*1328. *Chorizanthe membranacea*1329. *Chorizanthe spinosa*1330. *Chorizanthe Orcuttiana*1331. *Chorizanthe polygonoides*

28. *Chorizanthe rígida* (Torr.) Torr. & Gray.

Rigid Chorizanthe or Spiny-herb. Fig. 1332.

Acanthogonum rigidum Torr. Pacif. R. Rep. 4: 133. 1856.*Chorizanthe rígida* Torr. & Gray, Proc. Amer. Acad. 8: 198. 1870.

Stems erect, simple below, usually with a few short branches above, 3–8 cm. high, woolly-tomentose. Leaves of the main stem alternate, the blades ovate to broadly obovate, 1–3 cm. long, exceeded by the slender petioles, woolly-tomentose beneath, glabrous above, bearing 1 to several short flowering branches in the axils, these densely clothed by subulate spinose bracts becoming indurate and forming a dense thorny mass in age; involucre in clusters in the axils of the bracts, the tube 2 mm. long, acutely 3-angled, prominently reticulate between the angles, teeth 3, lanceolate, spreading, straight or spine-tipped, unequal, 4–15 mm. long; calyx-lobes oblong, pubescent, yellow; stamens 9.

Rocky ridges, Lower Sonoran Zone; Inyo County south through the Mojave and Colorado Deserts, California, to northern Lower California east to southern Nevada, western Arizona, and Sonora. Type locality: "On William's River [Arizona], a fork of the Colorado." March–June.

29. *Chorizanthe Watsonii* Torr. & Gray.

Watson's Chorizanthe or Spiny-herb. Fig. 1333.

Chorizanthe Watsonii Torr. & Gray, Proc. Amer. Acad. 8: 199. 1870.

Stems erect or ascending, 5–10 cm. high, well-branched, appressed villous-tomentose and sometimes reddish. Leaves oblanceolate, 2–3 cm. long including the petiole, tomentose below, appressed-villous above; lower bracts similar to the basal leaves but narrower, the upper acicular; involucre solitary or sometimes 2 or 3 in the axils of the cyme, cylindric, 3–4 mm. long, appressed-pubescent, 5-toothed, four of the teeth short, recurved, uncinat, the anterior one much larger, broadly lanceolate; calyx 3–4 mm. long, yellow, sparingly pubescent on the cylindric tube, the lobes oblong, acute; stamens 9.

Dry ridges and slopes, Upper and Lower Sonoran Zones; southeastern Washington and southwestern Idaho south, east of the Cascade-Sierra Nevada Divide, to the Colorado Desert, California, and western Arizona. Type locality: dry washes of the foothills from the Humboldt to Reese River, Nevada. April–June.

30. *Chorizanthe corrugata* (Torr.) Torr. & Gray.

Wrinkled Chorizanthe or Spine-flower. Fig. 1334.

Acanthogonum corrugatum Torr. Pacif. R. Rep. 5: 364. 1856.*Chorizanthe corrugata* Torr. & Gray, Proc. Amer. Acad. 8: 198. 1870.

Stems erect, 5–15 cm. high, becoming much branched above, villous-tomentose. Leaves basal, slender-petioled, the blades orbicular, 1–2 cm. broad, woolly-tomentose beneath, villous above; bracts opposite, the lower foliaceous, spatulate, the upper reduced and acicular; involucre solitary in the axils and loosely scattered in the lower forks, densely crowded above; the tube cylindric, 2–5 mm. long, conspicuously transversely corrugated, 3-toothed, the teeth lanceolate, equaling or exceeding the tube, spreading, the short spinose tip recurved not uncinat; calyx-lobes oblong, obtuse; stamens 6; achene papulose at apex.

Sandy washes and flats, Lower Sonoran Zone; Death Valley region, California, to northern Lower California and western Arizona. Type locality: near Fort Yuma, Arizona. March–May.

31. *Chorizanthe Vortriedei* Brandg.

Vortriede's Chorizanthe or Spine-flower. Fig. 1335.

Chorizanthe Vortriedei Brandg. Zoe 4: 158. 1893.*Centrostegia Vortriedei* Goodman, Ann. Mo. Bot. Gard. 21: 91. 1934.

Stems low, spreading, trichotomously branched at the first node, dichotomous above, 6–15 cm. long, sparsely and inconspicuously glandular. Leaves basal, spatulate, 1–2 cm. long, glabrous; bracts small, deeply 3-lobed, the lobes triangular-lanceolate; involucre solitary at the rather distant nodes, the tube 4-angled, 4-toothed, the teeth triangular-ovate, little spreading, cuspidate; flowers 2, on slender pedicels; calyx yellowish, 5-parted, the lobes 2-cleft and white at apex; stamens 9.

Dry gravelly or sandy soils, Upper Sonoran Zone; Santa Lucia Mountains, Monterey County, California. Type locality: Santa Lucia Mountains, California. June–Sept.

32. *Chorizanthe insignis* Curran.

Indian Valley Chorizanthe or Spine-flower. Fig. 1336.

Chorizanthe insignis Curran, Bull. Calif. Acad. 1: 275. 1885.*Oxytheca insignis* Goodman, Ann. Mo. Bot. Gard. 21: 91. 1934.

Stem erect, simple below, dichotomous with divergent branches above, 5–10 cm. high, glandular-puberulent. Leaves basal, narrowly spatulate, 8–15 mm. long, glabrous; bracts 3-lobed; lobes lanceolate, 3–4 mm. long, the upper subulate-acicular; involucre solitary at the nodes, very short-peduncled, glandular, the tube prismatic-cylindric, 3–4 mm. long, slightly corrugated; teeth 5, acicular, divergent, straight, about 3 mm. long; flowers 4–6, pedicelled; calyx rose-colored, pubescent, the lobes oblong; stamens 9.

Sandy soils, Sonoran Zones; Inner Coast Ranges, Monterey and San Luis Obispo Counties, California. Type locality: "Indian Valley near the Salinas River," near the boundary of Monterey and San Luis Obispo Counties. June–Sept.

33. *Chorizanthe californica* (Benth.) A. Gray.
California Chorizanthe or Spine-flower. Fig. 1337.

Mucronea californica Benth. Trans. Linn. Soc. 17: 419. pl. 20. 1836.

Chorizanthe californica A. Gray, Proc. Bost. Soc. Nat. Hist. 7: 149. 1859.

Stems erect or ascending, dichotomously branched above, 8–25 cm. high, glandular-hirsutulose. Leaves basal, spatulate, 1–3 cm. long, the blade narrowed to a slightly winged petiole; bracts deeply 3-lobed, sessile clasping at base, 5–10 mm. long, the lobes ovate-lanceolate, acute or abruptly acuminate into a straight slender spine, hirsute-tomentose; involucre 2–3 in the axils; the tube cylindric, 2.5–3 mm. long, obscurely ribbed, teeth 3 or rarely 4, unequal, outwardly curved, ending in a straight spine; calyx white, partly exserted, the lobes oblong, obtuse, entire, pubescent; cotyledons accumbent.

Dry sandy slopes and washes, Upper and Lower Sonoran Zones; San Luis Obispo County south, in cismontane southern California to San Diego. Type locality: "California," collected by Douglas. April–July.

Chorizanthe californica var. *Suksdorfii* J. F. McBride, Contr. Gray Herb. II, No. 53: 6. 1918. A robust, apparently ecological form growing in or near sand dunes near Surf and Playa del Rey, southern California. The bracts are more prominent, their lobes obtuse and mucronate.

34. *Chorizanthe perfoliata* A. Gray.
Perfoliate Chorizanthe or Spine-flower. Fig. 1338.

Chorizanthe perfoliata A. Gray, Proc. Bost. Soc. Nat. Hist. 7: 148. 1859.

Mucronea perfoliata Heller, Muhlenbergia 2: 23. 1905.

Stems branched from the base, diffuse, 15–35 cm. high, sparsely puberulent, sparsely glandular with subsessile or short-stalked glands; whole plant becoming reddish in age. Leaves basal, 2–4 cm. long, spatulate; bracts perfoliate, orbicular or shallowly 3-lobed, with the lobes or angles spine-tipped, those on the main branches often 15–18 mm. in diameter; involucre usually solitary in the axil of the bracts, 4–8 mm. long, the tube 4-angled, corrugated between the angles; flowers pedicelled; calyx puberulent; stamens 6.

Sandy or rocky soils, Sonoran Zones; Inner Coast Ranges from Stanislaus County to San Luis Obispo County; head of San Joaquin Valley and Victorville, Mojave Desert, California. Type locality: near Fort Tejon, Tehachapi Mountains, California. April–June.

35. *Chorizanthe Thúrberi* (A. Gray) S. Wats.
Thurber's Chorizanthe or Spine-flower. Fig. 1339.

Centrostegia Thurberi A. Gray ex Benth. in DC. Prod. 14: 27. 1857.

Chorizanthe Thurberi S. Wats. Proc. Amer. Acad. 12: 269. 1877.

Chorizanthe Thurberi var. *cryptantha* Curran, Bull. Calif. Acad. 1: 275. 1885.

Stems erect, 5–15 dm. high, dichotomously branched from or near the base, the branches slender, spreading, sparsely glandular-hispidulose. Leaves basal, 1–3 cm. long, oblong to spatulate, narrowed to a short winged petiole, ciliolate on the margins, otherwise glabrous; bracts 3-lobed, spine-tipped; involucre solitary in the axils of the bracts, 4–6 mm. long, 3-angled with 3 divaricately spreading saccate horns near the base, 5-toothed at apex, the teeth erect, tipped by slender straight spines; calyx included, pubescent, deeply parted; stamens 6 or 9.

Sandy or gravelly soils, Sonoran Zones; Inner South Coast Ranges, southern Sierra Nevada and Inyo County, south to the Mojave and Colorado Deserts, California, east to Nevada and western Arizona. Type locality: San Felipe, San Diego County, California. April–June.

36. *Chorizanthe leptóceras* (A. Gray) S. Wats.
Slender-horned Chorizanthe or Spine-flower. Fig. 1340.

Centrostegia leptoceras A. Gray, Proc. Amer. Acad. 8: 192. 1870.

Chorizanthe leptoceras S. Wats. Proc. Amer. Acad. 12: 269. 1877.

Eriogonella leptoceras Goodman, Ann. Mo. Bot. Gard. 21: 91. 1934.

Stems erect, branching from the base, 5–20 cm. high, the branches slender, divaricately spreading, glabrous. Leaves basal, oblanceolate, 1–2.5 cm. long, glabrous; bracts 3-lobed, 3–6 mm. long, the lobes spine-tipped, pubescent; involucre 1–2 in the axils, 4–6 mm. long, the tube cylindric, spurred at base with 6 slender spreading uncinat spines, 6-toothed at apex, the teeth erect ending in a slender straight spine; calyx slender-pedicelled, partly exserted, pubescent, the lobes spatulate.

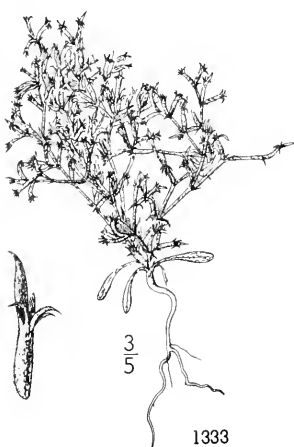
Dry sandy soil, Sonoran Zones; cismontane southern California, San Fernando Valley, Los Angeles County, to Elsinore, Riverside County, California. Type locality: "Plains of San Gabriel," Los Angeles County, California. May–June.

7. *OXYTHÈCA* Nutt. Journ. Acad. Phila. II. 1: 169. 1848.

Slender, dichotomously branched annuals, stipitate-glandular at the nodes. Leaves forming a rosette at base of the stem. Bracts foliaceous and more or less united, usually ternate. Involucre borne on slender pedicel-like peduncles, turbinate, 4–5-cleft with the teeth bearing a terminal awn, or truncate, with 7–20 ribs prolonged into as many acicular awns, longer than the tube. Flowers few to several in the involucre, often subtended by minute bractlets, pedicelled; calyx 6-parted, glabrous or pubescent. Stamens 9, in-



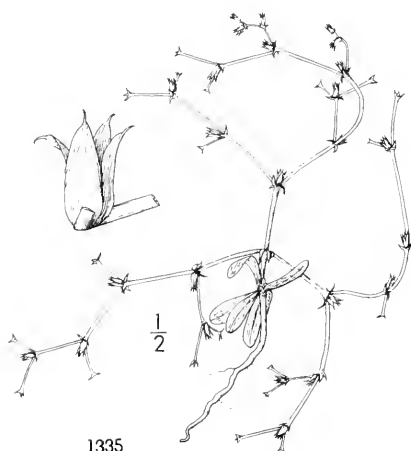
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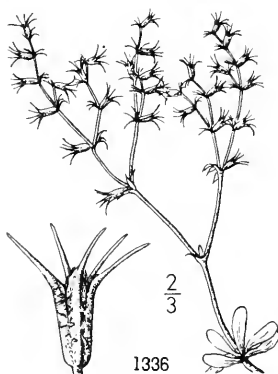
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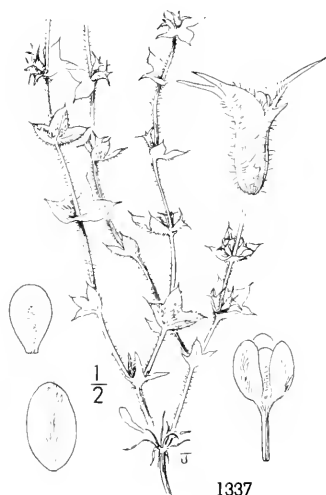
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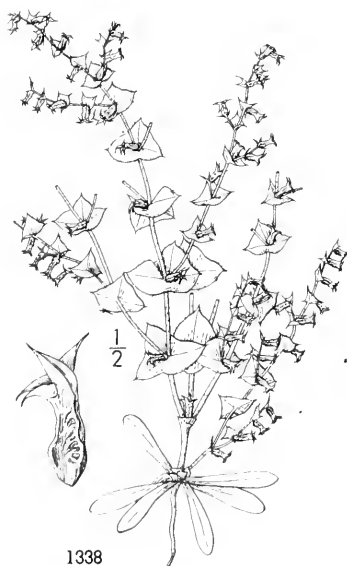
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1332. *Chorizanthe rigida*
 1333. *Chorizanthe Watsonii*
 1334. *Chorizanthe corrugata*

1335. *Chorizanthe Vortriedei*
 1336. *Chorizanthe insignis*
 1337. *Chorizanthe californica*

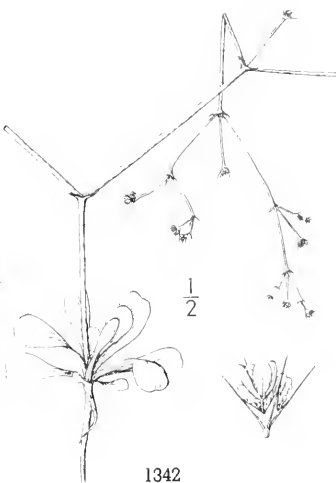
1338. *Chorizanthe perfoliata*
 1339. *Chorizanthe Thurberi*
 1340. *Chorizanthe leptoceras*



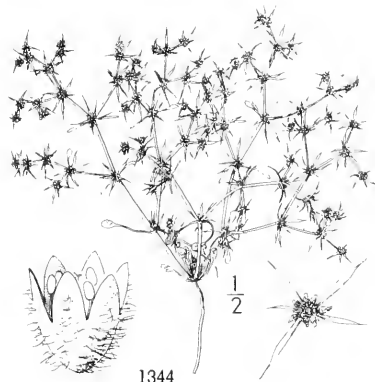
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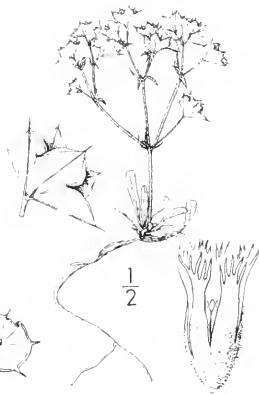
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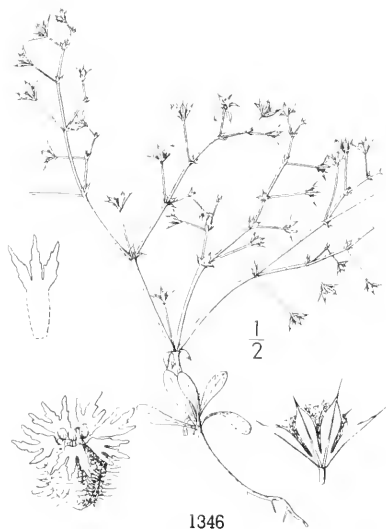
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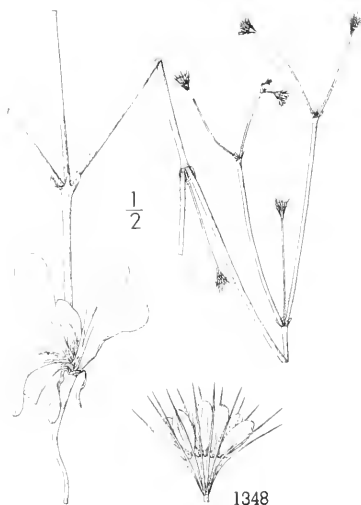
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1341. *Oxytheca dendroidea*1342. *Oxytheca Watsonii*1343. *Oxytheca perfoliata*1344. *Oxytheca luteola*1345. *Oxytheca caryophylloides*1346. *Oxytheca trilobata*1347. *Oxytheca emarginata*1348. *Oxytheca Parishii*

serted at the base of the calyx-tube. Cotyledons accumbent, orbicular. [Name Greek, meaning spiny case, in reference to the spiny involucre.]

A genus of 8 or 9 species, inhabiting arid regions of western North America, also Chile and Argentina. Type species, *Oxytheca dendroidea* Nutt.

Involucres lobed.

Involucre 4-lobed.

Bracts united only at base; involucre mostly on slender pedicel-like peduncles.

Leaves narrowly linear or linear-oblongate, acute, hirsutulose.

1. *O. dendroidea*.

Leaves broadly or narrowly spatulate, rounded at apex, hispidulose, especially on the margin.

2. *O. Watsonii*.

3. *O. perfoliata*.

Bracts orbicular-perfoliate, the lobes indicated only by marginal bristles.

Involucre 5-lobed.

Involucres deeply divided into narrow lobes.

Plants prostrate; involucre sessile; the lobes of unequal length; calyx yellow.

4. *O. luteola*.

Plants erect; involucre on slender pedicel-like peduncles; calyx white or pinkish.

Calyx-lobes entire.

5. *O. caryophylloides*.

Calyx-lobes deeply cleft.

6. *O. trilobata*.

Involucres a conspicuous round disk, the margin with 5 broad shallow lobes, with scarious margins.

7. *O. emarginata*.

8. *O. Parishii*.

Involucres not lobed, the tube 7–25-ribbed, each rib ending in a prominent bristle.

1. *Oxytheca dendroidea* Nutt. Tree-like or Nuttall's *Oxytheca*. Fig. 1341.

Oxytheca dendroidea Nutt. Journ. Acad. Phila. II. 1: 169. 1848.

Oxytheca foliosa Nutt. Journ. Acad. Phila. II. 1: 169. 1848.

Eriogonum dendroideum Stokes, Gen. Eriog. 27. 1936.

Eriogonum dendroideum var. *Hillmanii* Stokes, Gen. Eriog. 27. 1936.

Stem erect, 15–40 cm. high, dichotomously or trichotomously branched above the base, forming a broad crown, the ultimate branchlets nearly capillary, sparsely stipitate-glandular. Leaves basal, narrowly linear to linear-oblongate, 1.5–3 cm. long, acute at apex, narrowed below to the petiole, hirsute especially on the midrib and margins; involucre solitary on very slender, often very short peduncles, arising from the axil of the bracts at all the nodes, turbinate, 4.5 mm. long, 4-lobed, each lobe tipped by a straight spine 1–2 mm. long; flowers 2–3, exserted on slender pedicels; calyx white or rose-colored, 1.5 mm. long, hispidulose.

Sandy flats and slopes, Upper Sonoran Zone; eastern Washington, Idaho, and Wyoming south to Nevada and Mono County, California. Type locality: "sandy hills, Snake River, Rocky Mountains." Nuttall. June–Sept.

Plants apparently conspecific with this species are found in Chile and Argentina.

2. *Oxytheca Watsonii* Torr. & Gray. Watson's *Oxytheca*. Fig. 1342.

Oxytheca Watsonii Torr. & Gray, Proc. Amer. Acad. 8: 191. 1870.

Eriogonum cuspidatum Stokes, Gen. Eriog. 27. 1936.

Stems erect, dichotomously branched above, 10–20 cm. high, glaucous, sparingly stipitate-glandular. Leaves basal, broadly to narrowly spatulate, 15–25 cm. long, rounded or obcordate at apex, hispidulose; bracts connate on one side, ovate-lanceolate, awned; involucre on slender peduncles, turbinate, 1.5–2 mm. long, 4-lobed, each tipped with a straight awn about 2 mm. long; flowers several, pedicelled; calyx 1.5 mm. long, white, puberulent especially on the midvein.

Dry gravelly or sandy soils, Sonoran Zones; western Nevada, and western edge of Mojave Desert (Cushenberry Springs), California. Type locality: Monitor Valley, Nevada. May–July.

3. *Oxytheca perfoliata* Torr. & Gray. Perfoliate *Oxytheca*. Fig. 1343.

Oxytheca perfoliata Torr. & Gray, Proc. Amer. Acad. 8: 191. 1870.

Eriogonum perfoliatum Stokes, Gen. Eriog. 28. 1936.

Stems erect, widely branched from the first node, stipitate-glandular on lower half of internodes otherwise glabrous, usually more or less tinged with reddish purple. Leaves basal, spatulate, 1.5–3 cm. long, glabrous; bracts at first node 2 or 3, small, deeply lobed; the others conspicuous, perfoliate and nearly orbicular, 1–2 cm. broad, spine-tipped at the ends of the usually 3 midveins, those subtending the involucre often much reduced and acicular; involucre solitary, narrowly turbinate, 3–4 mm. long, 4-lobed to the middle, the lobes tipped by spines about 3 mm. long; flowers several; calyx 1.5 mm. long, white tinged with pink, strigose.

Sandy or gravelly soils, Sonoran Zones; Lassen County to the Mojave Desert, California, east to Nevada and northwestern Arizona. Type locality: Nevada. May–July.

4. *Oxytheca luteola* Parry. Yellow *Oxytheca*. Fig. 1344.

Oxytheca luteola Parry, Bull. Torrey Club 10: 23. 1893.

Gymnogonum spinescens Parry, Bull. Torrey Club 10: 23, as a synonym. 1893.

Eriogonum spinescens Stokes, Gen. Eriog. 28. 1936.

Stems several from the base, prostrate, 3–10 cm. long, yellowish, pubescent. Leaves at base with rounded blades, 2–5 mm. long, glabrate above, white-tomentose beneath, on petioles 15–20 mm. long, those of the stem opposite and similar; bracts linear, acicular, 4–5 mm. long; involucre borne at the nodes, 5-parted, the divisions unequal, linear-lanceolate, long-awned; flowers several; calyx 1 mm. long, tomentose on the globose tube, the lobes glabrous, yellow.

Alkaline soils, Sonoran Zones; San Joaquin Valley, Madera County to Kern County, and western end of Mojave Desert, California. Type locality: near Lancaster, Los Angeles County, California. June–Aug. (Yellow Spiny-cape.)

5. *Oxytheca caryophylloides* Parry. Chickweed *Oxytheca*. Fig. 1345.*Oxytheca caryophylloides* Parry, Proc. Davenp. Acad. 3: 175. 1882.*Eriogonum caryophylloides* Stokes, Gen. Eriog. 28. 1936.

Stems solitary or 2 or 3 from the base, erect, tri- and dichotomously branched, 15–40 cm. high, stipitate-glandular, the ultimate branches subcapillary. Leaves basal, spatulate-oblongate, 2–5 cm. long, sparsely pubescent at least on the midrib and margins; bracts 3-lobed, the lower often foliaceous, 10–15 mm. long, the upper reduced and mucronate; involucre 5-parted almost to the base, glabrous, the lobes narrowly oblong, 3 mm. long, tipped by an awn 1 mm. long; flowers 2–3; calyx scarcely 1 mm. long, greenish, strigose, the lobes very short and entire.

Sandy or gravelly soils, Arid Transition Zone; San Antonio, San Bernardino and San Jacinto Mountains, southern California. Type locality: San Bernardino Mountains. July–Sept.

6. *Oxytheca trilobata* A. Gray. Three-lobed *Oxytheca*. Fig. 1346.*Oxytheca trilobata* A. Gray, Proc. Amer. Acad. 12: 83. 1876.*Eriogonum trilobatum* Stokes, Gen. Eriog. 27. 1936.

Stems erect or the first internode very short and the branches widely spreading, usually trichotomous at first node, and dichotomous above, 10–40 cm. high, minutely and sparingly glandular. Leaves basal, spatulate-oblongate, rounded at apex, 1.5–3 cm. long, sparsely pubescent on both surfaces; bracts deeply 3-lobed, the lobes lanceolate, 2–5 mm. long, awned with a spine; involucre mostly on slender pedicel-like peduncles, broadly turbinate, deeply 5-lobed; lobes lanceolate, 3 mm. long, tipped by a bristle awn of about equal length; flowers short-pedicelled; calyx white; lobes 2-cleft, erose on the sides, strigose.

Dry slopes, Upper Sonoran and Arid Transition Zones; San Gabriel and San Bernardino Mountains, California, to San Pedro Martir Mountains, Lower California. Type locality: San Bernardino County, California. June–Aug.

7. *Oxytheca emarginata* Hall. White-margined *Oxytheca*. Fig. 1347.*Oxytheca emarginata* Hall, Univ. Calif. Pub. Bot. 1: 75. pl. 14. 1902.*Eriogonum emarginatum* Stokes, Gen. Eriog. 27. 1936.

Stems erect, branching from the first node, 5–15 cm. high, glandular-pubescent. Leaves basal, spatulate, 1.5–2.5 cm. long, pubescent on both surfaces; bracts deeply 3-lobed, the lobes lanceolate, spine-tipped, often recurved; involucre conspicuous, green or usually reddish purple, broadly funnel-form, 4–6 mm. high, and as broad, shallowly and broadly 5-lobed, the lobes tipped with slender spines and scarious-margined; flowers 3–4; calyx 6-parted, the lobes fringed at apex, pubescent.

Gravelly ridges, Arid Transition and Upper Sonoran Zones; San Jacinto Mountains, southern California. Type locality: gravelly ridges near Tauquitz Peak, San Jacinto Mountains, California. July–Aug.

8. *Oxytheca Parishii* Parry. Parish's *Oxytheca*. Fig. 1348.*Oxytheca Parishii* Parry, Proc. Davenp. Acad. 3: 176. 1882.*Acanthoscyphus Parishii* Small, Bull. Torrey Club 25: 53. 1898.*Acanthoscyphus Abramsii* McGregor, Bull. Torrey Club 36: 605. 1909.*Eriogonum Abramsii* Stokes, Gen. Eriog. 28. 1936.

Stems erect, mostly solitary, tri- or dichotomously branched, the branches relatively few with rather long internodes, 15–40 cm. high, stipitate-glandular toward the base of each internode, otherwise glabrous and glaucous-green. Leaves basal, broadly spatulate, 2–3 cm. long, short-ciliate or ciliate-denticulate on the margins; bracts small, 3-lobed, the lobes lanceolate-subulate; involucre terminating slender pedicel-like peduncles, broadly turbinate, the tube not lobed, 7–25-ribbed, each rib terminating in a bristle-like spine 3–6 mm. long; flowers several, slender-pedicelled; calyx deeply 6-lobed; lobes linear-oblong, entire, strigose on the back.

Open pine forests, and dry slopes, Arid Transition Zone; Mount Pinos to the San Bernardino Mountains, California. Type locality: San Bernardino Mountains. June–Sept.

8. *ERIÓGONUM* Michx. Fl. Bor. Amer. 1: 246. 1803.

Annual or perennial herbs, or some species suffrutescent or shrubby. Leaves entire, alternate, opposite or whorled, without stipules. Flowers perfect, involucre. Involucres campanulate to cylindric, 4–8-toothed or -lobed, awnless, several- to many-flowered; pedicels more or less exserted, intermixed with scarious setaceous bracts or bractlets. Calyx 6-parted or deeply 6-cleft, petaloid. Stamens 9, inserted at the base of the calyx. Styles 3-parted to the base; stigmas capitate. Achene triangular or rarely lenticular. [Name Greek, meaning woolly and knee or joint, Michaux's species being hairy at the node.]

A North American genus of about 150 species, most highly developed in the western United States. Type species, *Eriogonum tomentosum* Michx.

Calyx attenuated and stipe-like at base (see also 55, 56); bracts foliaceous, indefinite in number (2–5 or more).
I. *EVERIOGONUM*.

Calyx not stipe-like at base; bracts regularly ternate, not foliaceous.

Involucres solitary at the node; stems not articulate.

Involucre campanulate or turbinate, not angled and very rarely obscurely nerved; teeth rounded, often membranously margined.
II. *GANYSMA*.

Involucre cylindric-turbinate or prismatic, strongly 5–6-nerved, often becoming costate or angled; teeth short, erect.
III. *OREGONIUM*.

Involucres usually 3 at the node, one in the axil of each bract; stems articulate internally; perennial herb.

IV. *CLASTOMYELON*.

I. EUERIOGONUM

Perennials with a simple or usually a branched and more or less caespitose woody caudex. Leaves borne on the ends of the caudex branches, often tufted. Flowering stems scapiform, bractless or with a whorl of bracts near the middle or at the base of the umbel. Umbels simple or sometimes compound, bearing a single involucre at the end of each ray, sometimes congested into heads by shortening of the rays; involucre turbinate, neither ribbed nor angled, 4-8-toothed or -lobed. Calyx narrowed to a stipe-like base, accrescent, the lobes oblong-obovate.

Calyx pubescent on the outer surface, at least toward the base, sometimes glabrous or nearly so in *tenuis*.

Involucre more or less deeply lobed, the lobes spreading and usually reflexed in age.

Bracts none; involucre solitary at the end of the naked scapiform flowering stem.

1. *E. caespitosum*.

Bracts present, in plants with a single ray and a solitary involucre appearing as if near the middle of the stem, and in those with umbels subtending the umbel.

Caudex branches decumbent forming mats; leaves densely white-tomentose on both surfaces; bracts appearing near the middle of the stem; involucre solitary, not umbellate.

Leaves spatulate to ovate, not revolute.

2. *E. Douglasii*.

Leaves linear, revolute; calyx sometimes nearly or quite glabrous.

3. *E. tenue*.

Caudex branches mostly erect, 10-20 cm. high; leaves white-tomentose beneath, greener and glabrate above; involucre usually umbellate.

Calyx villous with spreading hairs, the lobes 5-6 mm. long, the tube 2 mm. long.

4. *E. sphaerocephalum*.

Calyx silky-tomentose with short appressed hairs, the lobes 3-4 mm. long and the tube scarcely 1 mm. long.

5. *E. tripodium*.

Involucre toothed at the apex, the teeth short and erect or nearly so.

Bracts and involucre herbaceous.

Bracts appearing in a whorl near the middle of the flowering stem; involucre solitary; leaves linear, revolute, tomentose.

6. *E. thymoides*.

Bracts subtending the umbel; rays short, 1 to several.

Leaves oblanceolate; bracts several; calyx yellow; filaments hairy.

7. *E. Piperi*.

Leaves ovate to suborbicular; bracts 2; calyx rose-colored; filaments glabrous.

8. *E. pyrolaeifolium*.

Bracts and the involucre membranous and rose-colored; plants bright green and nearly glabrous.

9. *E. latens*.

Calyx glabrous on the outer surface.

Involucres merely toothed at the apex, the teeth short and erect or nearly so.

Bracts forming a whorl near the middle of the flowering stem; involucre solitary without subtending bracts.

Involucre narrowly turbinate, silky-tomentose, the teeth short, erect.

10. *E. Kelloggii*.

Involucre campanulate, arachnoid-tomentose, the teeth reflexed, about as long as the tube.

11. *E. siskiyouense*.

Bracts subtending the open or subcapitate umbel.

Styles scarcely 0.5 mm. long, erect or slightly spreading, turgid, glabrous.

Umbel mostly congested; leaves densely white-tomentose on both sides, mostly acute at base.

12. *E. incanum*.

Umbel usually open; leaves becoming glabrous above, mostly rounded at base.

13. *E. marifolium*.

Styles 2.5-3.5 mm. long; filaments 3-4 mm. long, densely long-woolly below, the wool filling the throat of the calyx.

Leaves broadly ovate, rounded or subcordate at base; flowers ochroleucous.

14. *E. ursinum*.

Leaves obovate to spatulate, attenuate at base; flowers sulphur yellow.

15. *E. ternatum*.

Involucres lobed, the lobes oblong or ovate-oblong, spreading or usually reflexed in age.

Stipes with a whorl of foliaceous bracts near the middle as well as at the base of the umbel; flowers ochroleucous.

16. *E. heracleoides*.

Stipes bracteate only at the base of the umbel (rarely with a solitary bract near the middle, or in some forms the umbel reduced to a single ray and a single involucre, then the whorl of bracts appearing as if on the stipe).

Flowers sulphur yellow or red.

17. *E. umbellatum*.

Flowers ochroleucous.

Stipes erect, often 3-5 dm. tall; leaves often 10-20 cm. long, mostly cordate at base.

18. *E. compositum*.

Stipes decumbent, 1-2 dm. long; leaves 5-10 cm. long, never cordate at base.

19. *E. Lobbii*.

II. GANYSMA

Annuals, or *trichopes* and *inflatum* sometimes persisting through the winter. Stems solitary or sometimes several from the tuft of basal leaves, more or less repeatedly dichotomously or trichotomously branched above, bearing a pair of small triangular more or less connate bracts at the nodes, and in some species also cauline leaves. Involucres solitary at the nodes, borne on slender pedicel-like peduncles, small, mostly 1-2 mm. long, turbinate or campanulate, 4-5-toothed or -lobed, not angled; filaments and pistil glabrous; achenes more or less 3-angled.

Involucres 4-lobed or 4-toothed.

Stem leaves all foliaceous except those of the uppermost nodes.

Plants more or less woolly-tomentose; involucre 1.5-2 mm. long; stem leaves opposite, sessile.

Flowers not concealed by cotton-like tomentum.

- Calyx-lobes similar, not concave, rounded at the apex, glabrous. 20. *E. gracillimum*.
- Calyx-lobes dissimilar, the outer deeply concave and clawed, glandular-puberulent. 21. *E. angulosum*.
- Flowers concealed by the conspicuous cotton-like tomentum of the inner surface of involucre and bractlets. 22. *E. gossypinum*.
- Plants pilose; leaves linear, revolute; involucre less than 1 mm. long. 23. *E. spergulinum*.
- Stem leaves all reduced to bracts, or those of first node sometimes foliaceous.
- Leaves all basal, often pilose but never tomentose.
- Calyx pubescent with hooked hairs.
- Branches not widely divergent; achenes distinctly exserted. 24. *E. hirtiflorum*.
- Branches widely divergent; achenes not exserted or obscurely so. 25. *E. inerme*.
- Calyx hispidulose or puberulent, the hairs not hooked.
- Calyx-lobes notched and apiculate at apex; leaves oblanceolate or obovate. 26. *E. apiculatum*.
- Calyx-lobes obtuse or acutish, not apiculate.
- Leaves spatulate; calyx rose-colored, minutely puberulent. 27. *E. Parishii*.
- Leaves rounded, often cordate; calyx yellow, hispidulose. 28. *E. trichopes*.
- Leaves basal and often at the first node, thinly tomentose on the lower surface, also on the lower portion of the stem; calyx pubescent. 29. *E. Ordii*.
- Involucres 5-lobed or 5-toothed.
- Leaves all basal, mostly rounded or reniform.
- Leaves pilose or hirsute, never tomentose.
- Calyx conspicuously pubescent on the outer surface; stem often inflated. 30. *E. inflatum*.
- Calyx glabrous; stem not inflated. 31. *E. esmeraldense*.
- Leaves white-woolly at least beneath.
- Calyx pubescent or glandular-puberulent on the outer surface, at least toward the base.
- Outer calyx-lobes saccate on either side of the cordate base. 32. *E. Thomasii*.
- Outer calyx-lobes neither saccate nor cordate at base.
- Involucre glandular-pubescent.
- Calyx glandular-puberulent only at base, the outer lobes rounded and abruptly narrowed to a short claw. 33. *E. Thurberi*.
- Calyx glandular-puberulent throughout on the outer surface, the outer lobes oblong-spatulate in age. 34. *E. pusillum*.
- Involucre glabrous; calyx glandular-puberulent on the outer surface. 35. *E. reniforme*.
- Calyx glabrous.
- Peduncles filiform; outer calyx-lobes obovate or quadrate not cordate at base. 36. *E. cernuum*.
- Peduncles stouter; outer calyx-lobes elliptic-ovate or round ovate, cordate at base. 37. *E. deflexum*.
- Leaves basal and also on the first and second nodes of the stem.
- Plants glabrous except for a thin arachnoid tomentum on lower surface of leaves; calyx glabrous. 38. *E. argillosum*.
- Plants densely white-tomentose throughout; calyx-lobes papillose on the outer surface. 39. *E. vestitum*.

III. OREGONIUM

Annuals, perennials or low shrubs, some glabrous but many of the species more or less white-tomentose. Bracts ternate, connate at base, seldom foliaceous, usually short and acute and more or less rigid. Involucres cylindric-turbinate or prismatic, erect, 5-6-veined, with as many short erect teeth, sessile or rarely subsessile in the axils of the bracts, clustered in heads, or scattered along the virgate branches or in racemes or cymes. Calyx rather abruptly contracted at base, not becoming attenuate in age (except in *crocatum* and *saxatile*); ovary and filaments mostly glabrous, the latter sometimes hairy at base.

Involucres solitary at the nodes, the lateral ones appressed to the branchlets.

Annuals.

- Calyx-lobes fan-shaped, their sides incurved below the broad truncate apex. 40. *E. nidularium*.
- Calyx-lobes not fan-shaped.
- Calyx conspicuously villous-pubescent. 41. *E. dasyanthemum*.
- Calyx not villous-pubescent.
- Outer surface of calyx puberulent or glandular-puberulent.
- Involucre turbinate; stems densely white-tomentose at base; flowers rose-colored. 42. *E. elegans*.
- Involucre cylindric; flowers yellow or white. 43. *E. Baileyi*.
- Outer surface of calyx glabrous or rarely minutely puberulent at base in *vimineum* and *Covilleianum*.
- Involucre scarcely 1 mm. long; calyx 0.7 mm. long, pale yellow. 44. *E. brachyanthum*.
- Involucre about 2 mm. or more in length; calyx over 1 mm. long.
- Inflorescence with elongated virgate branchlets, bearing involucres at the nodes, the lateral ones appressed.
- Leaves oblong-obovate to oblanceolate; whole plant more or less densely tomentose.
- Involucres 3 mm. long; flowers yellow, rarely tinged with rose. 45. *E. virgatum*.
- Involucres 1.5-2 mm. long; flowers white (sometimes yellow), often with the midvein of the lobes rose-colored.

- Petioles of basal leaves slender, not winged. 46. *E. gracile*.
 Petioles of basal leaves conspicuously winged by the decurrent blades, the margin crenately crisped. 47. *E. citharaeforme*.
 Leaves rounded to broadly ovate.
 Stems simple below, glabrous; branches few, erect, forming a narrow crown. 48. *E. molestum*.
 Stems branched from or near the ground, often tomentose, much branched above into a broad crown. 49. *E. vininum*.
 Inflorescence with short branchlets, usually composed of a single internode; involucre borne in the axils and at the ends of the branchlets.
 Branches of the inflorescence numerous forming a broad crown, the ultimate branchlets filiform and pedicel-like; flowers yellow. 50. *E. mohavense*.
 Branches of the inflorescence few, forming a cyme-like inflorescence.
 Leaves oblong-obovate, narrowed to the petiole; stems and involucre tomentose, the latter truncate as apex. 51. *E. truncatum*.
 Leaves rounded, more or less cordate at base; stems and involucre glabrous, the latter more or less turbinate.
 Involucres 5-veined, the 5 teeth short or obsolete. 52. *E. Covilleanum*.
 Involucres 8-veined and -toothed, broadly turbinate. 53. *E. Nortonii*.
- Perennials, herbaceous or shrubby.
 Calyx villous-pubescent on the outer surface; shrubby; involucre subsessile or short-pedicelled, tomentose. 54. *E. deserticola*.
 Calyx glabrous.
 Calyx tapering into a stipe-like base, becoming 5-7 mm. long in age.
 Involucres in a compact divaricately branched cyme, broadly campanulate; petiole broad and winged. 55. *E. crocatum*.
 Involucres scattered along the virgate branches of the inflorescence; petioles slender, not winged. 56. *E. saxatile*.
 Calyx not elongated at base, 1-3 mm. long.
 Outer surface of involucre tomentose.
 Calyx-lobes dissimilar, the outer broadly elliptic, rounded at base. 57. *E. niveum*.
 Calyx-lobes similar, usually obovate.
 Inflorescence indefinite; flowers mostly racemosely disposed.
 Involucres on the main ascending branches, racemosely disposed or scattered.
 Flowers racemosely disposed; involucre 2-3 mm. long.
 Plants caespitose with a much branched caudex; leaves oblanceolate. 58. *E. Wrightii*.
 Plants scapose from a simple or few-branched caudex; leaves ovate to oblong-ovate. 60. *E. racemosum*.
 Flowers scattered; involucre 5-7 mm. long. 61. *E. elongatum*.
 Involucres on lateral divaricate branchlets. 62. *E. nodosum*.
 Inflorescence a compact terminal corymbose cyme. 63. *E. microthecum*.
 Outer surface of the involucre glabrous.
 Caespitose perennial with scapose flowering stems. 59. *E. strictum*.
 Low desert half-shrubs with intricately branched stems, leafy below.
 Outer calyx-lobes obovate, narrowed at base. 64. *E. Plumetella*.
 Outer calyx-lobes suborbicular, subcordate at base. 65. *E. Heermannii*.
- Involucres in heads of two or more, rarely solitary; perennials.
 Caespitose perennials, the caudex low, much branched, forming dense mats or cushions; flowering stems scape-like.
 Calyx-lobes dissimilar, the outer much broader and cordate at base.
 Inflorescence a single terminal head. 66. *E. ovalifolium*.
 Inflorescence cymose-umbellate. 67. *E. proliferum*.
 Calyx-lobes similar, not cordate at base; involucre in a single head terminating the scape-like flowering stem.
 Leaves oblanceolate or spatulate, long-petioled, not revolute. 68. *E. ochrocephalum*.
 Leaves oblong-linear, strongly revolute, subsessile or short-petioled. 69. *E. Kennedyi*.
- Shrubs, or if herbaceous the caudex not caespitose; calyx-lobes similar at least in age.
 Perennials, with a more or less woody root crown or short few-branched caudex.
 Leaves spreading, oblong-ovate, obtuse, 2-5 cm. long.
 Involucres and usually the flowering stems glabrous.
 Heads one or few; stems not fistulose. 70. *E. latifolium*.
 Heads usually several to many; stems fistulose.
 Leaves in basal rosettes crowning the rootstocks. 71. *E. nudum*.
 Leaves scattered along the branches of the erect woody caudex. 72. *E. grande*.
 Involucres and flowering stems tomentose. 73. *E. Harfordii*.
 Leaves erect, ovate-lanceolate, acute, 4-12 cm. long. 74. *E. elatum*.
- Shrubs 3-15 dm. high.
 Leaves orbicular to linear-oblong, not fascicled.
 Calyx glabrous without; heads mostly few and scattered. 75. *E. parvifolium*.
 Calyx villous without.
 Heads few, scattered along the stem. 76. *E. cinereum*.
 Heads many in compound cymes.
 Leaves ovate to oblong-ovate. 77. *E. giganteum*.
 Leaves linear-oblanceolate, revolute. 78. *E. arborescens*.
 Leaves narrowly linear, fascicled; flowers umbellate. 79. *E. fasciculatum*.

IV. CLASTOMYELON

Perennial herbs, with erect stems, divided into many transverse articulations becoming externally obvious in old stems. Leaves all basal. Inflorescence virgately branched. Involucres mostly in whorls of 3 at the nodes, each sessile in the axils of a bract, filled and soon ruptured by the many expanding flowers and bractlets, campanulate, not angled, 5-parted; calyx rounded at base; pedicels pilose; achenes flask-shaped, trilobate at base.

Stems usually solitary, simple below, erect, 8–12 dm. high.

80. *E. intrafractum*.

1. *Eriogonum caespitosum* Nutt. Cespitose Eriogonum. Fig. 1349.

Eriogonum caespitosum Nutt. Journ. Acad. Phila. 7: 50. pl. 8. f. 2. 1834.

Woody caudex much branched forming low compact mats. Leaves oval or elliptic, 5–10 mm. long, densely white-tomentose on both surfaces, short-petioled, more or less revolute; flowering stems scape without bracts, slender, 2–10 cm. long; involucre solitary, tomentose, the tube turbinate, about 3 mm. long, the lobes oblong-linear, longer than the tube, becoming reflexed; calyx yellow turning reddish brown in age and 4–5 mm. long, villous below; filaments in sterile flowers 2.5 mm. long, in fruiting flowers 1.5 mm. long, with abortive anthers, pilose; achene sparsely pubescent at apex or often glabrous; styles 1 mm. long, not reflexed.

Rocky or gravelly, especially volcanic soils, Upper Sonoran to Canadian Zones; Lake and Harney Counties, Oregon, to Modoc County and White Mountains, Inyo County, California, east to Idaho, northern Nevada, Montana, Wyoming, and Colorado. Type locality: headwaters of the Columbia, probably in Idaho. May–Aug.

2. *Eriogonum Douglasii* Benth. Douglas' Eriogonum. Fig. 1350.

Eriogonum Douglasii Benth. in DC. Prod. 14: 9. 1856.

Eriogonum caespitosum var. *Douglasii* Jones, Contr. West. Bot. No. 11: 7. 1903.

Eriogonum nevadense Gandoger, Bull. Soc. Bot. Belg. 42: 188. 1906.

Woody caudex much branched, forming mats, often 3–4 dm. across. Leaves densely white-tomentose on both surfaces, forming a dense rosette at the end of the branchlets, 4–12 mm. long, obovate to oblanceolate, narrowed at base to a short petiole, rather thick, the margins sometimes slightly revolute; flowering stems 3–10 cm. long, bearing a whorl of narrowly oblanceolate foliaceous bracts near the middle; involucre solitary, the tube narrowly turbinate, 3 mm. long, the lobes oblong, as long as the tube; calyx bright yellow often turning reddish in age, 5–6 mm. long including the stripe-like base, villous-pubescent without on the midvein and toward the base, and sparingly so within; filaments pubescent below; achenes sharply angled, sparingly pubescent above.

Dry rocky ledges and slopes, Upper Sonoran and Arid Transition Zones; eastern Washington to the central Sierra Nevada, California, and western Nevada. Type locality: Blue Mountains, Oregon. May–Aug.

3. *Eriogonum tenue* Small. Klickitat Eriogonum. Fig. 1351.

Eriogonum tenue Small, Bull. Torrey Club 25: 41. 1906.

Eriogonum sphaerocephalum tenue Piper, Contr. U.S. Nat. Herb. 11: 236. 1906.

Cespitose, the woody caudex much branched. Leaves forming rosettes at the ends of the branchlets, narrowly linear, narrowed below, strongly revolute, 5–15 mm. long, cinereous with a dense woolly tomentum on both surfaces; flowering stems 4–7 cm. high, naked or with a whorl of foliaceous bracts near the middle, tomentose; involucre without bracts, the lobes linear-oblong, equaling or longer than the tube, reflexed, many-flowered; calyx ochroleucous, glabrous or nearly so, the lobes oblong-obovate; filaments 3 mm. long, hairy below; achene 4.5 mm. long including the short beak, short-pubescent above; styles slender, coiled back, about 2 mm. long.

Sterile rocky soil, Upper Sonoran Zone; Kittitas County to Klickitat County, eastern Washington. Type locality: "On the Columbia River, in West Klickitat County, Washington." April–June.

4. *Eriogonum sphaerocephalum* Dougl. Round-headed Eriogonum. Fig. 1352.

Eriogonum sphaerocephalum Dougl. ex Benth. Trans. Linn. Soc. 17: 407. 1837.

Caudex with decumbent loosely cespitose suffruticose branches, 5–10 cm. high. Leaves verticillate at the apex and upper node of the branches, narrowly oblanceolate, 1–3 cm. long, floccose or glabrate above, densely white-tomentose beneath, revolute on the margin; flowering stems erect or ascending, 5–10 cm. long, bearing a verticil of foliaceous bracts above the middle; involucre solitary, the tube broadly turbinate, the lobes 7–8, linear-oblong, as long or longer than the tube, at length reflexed; flowers numerous forming a globose head; calyx cream or yellow, villous-tomentose; filaments pubescent below; styles 2.5 mm. long; achene pubescent above.

Dry rocky places, mainly Upper Sonoran Zone; Kittitas County, Washington, to Siskiyou County, California, east to Idaho and northern Nevada. Type locality: Columbia River, Washington. May–July.

5. *Eriogonum tripodum* Greene. Tripod Eriogonum. Fig. 1353.

Eriogonum tripodum Greene, Pittonia 1: 39. 1887.

Woody caudex, more loosely branched than the preceding species. Leaves linear-spatulate, 15–25 mm. long, narrowed to a short petiole, white-tomentose on both surfaces, revolute on the margin; flowering stems 18–35 cm. high, slender; umbels 3- rarely 2-rayed, the rays 4–10 cm. long, subtended by a whorl of foliaceous bracts and sometimes bearing a whorl near the middle of one or two of the rays; involucre solitary, densely tomentose, the lobes linear-oblong, shorter than

the tube, reflexed; calyx yellow, densely villous tomentose, 4–5 mm. long; filaments pilose below; achenes pubescent at apex.

Gravelly soils, Upper Sonoran and Arid Transition Zones; Lake and Mariposa Counties, California. Type locality: Hough's Springs, Lake County, California. May–Aug.

6. *Eriogonum thymoides* Benth. Thyme-leaved Eriogonum. Fig. 1354.

Eriogonum thymoides Benth. in DC. Prod. 14: 9. 1856.

Eriogonum thymoides subsp. *congestum* Stokes, Gen. Eriog. 102. 1936.

Caudex much branched, caespitose, from a stout root clothed with shredded bark. Leaves tufted at the end of the branches, linear, 4–16 mm. long, densely white-tomentose beneath, cinereous above, the margins becoming strongly revolute; flowering stems slender, 2–6 cm. high, appressed-pubescent, bearing a whorl of foliaceous bracts near the middle; involucre solitary, turbinate, 5 mm. long, short-villous, the teeth ovate, only slightly spreading; calyx cream yellow, often turning deep rose, densely white-villous without, stipe-like base very short; filaments villous below; achene pubescent above on the angles.

Dry sterile soil in sagebrush, Upper Sonoran Zone; eastern Washington and northeastern Oregon to Idaho. Type locality: on the Spokane River, Washington. April–June.

7. *Eriogonum Piperi* Greene. Piper's Eriogonum. Fig. 1355.

Eriogonum Piperi Greene, Pittonia 3: 263. 1898.

Eriogonum flavum subsp. *Piperi* Stokes, Gen. Eriog. 117. 1936.

Caudex with short woody branches clothed with the persistent petioles. Leaves oblanceolate, 3–10 cm. long, the petiole slender, longer than the blade, white-tomentose beneath, green and thinly villous above; flowering stems scapiform, 10–30 cm. high, villous; bracts subtending the simple umbel, foliaceous, usually 5 or 6, oblanceolate; rays obscure, 5–20 mm. long; involucre obconic, 6–8 mm. long, shallowly undulate-dentate; calyx yellow, conspicuously villous without, stipe-like base 1–1.5 mm. long; filaments hairy below; achenes pubescent above.

Alpine slopes and ridges, Hudsonian Zone; Blue and Wallowa Mountains, southeastern Washington, and adjacent Oregon to western Montana and Wyoming. Type locality: Blue Mountains, Washington. July–Aug.

8. *Eriogonum pyrolaeifolium* Hook. Pyrola-leaved Eriogonum. Fig. 1356.

Eriogonum pyrolaeifolium Hook. Kew Journ. Bot. 5: 395. pl. 10. 1853.

Eriogonum pyrolaeifolium var. *coryphaeum* Torr. & Gray, Proc. Amer. Acad. 8: 162. 1870.

Caudex simple or few-branched arising from a deep-seated root, clothed with the old leaf bases. Leaves ovate to suborbicular, 1–3 cm. long, thickened, villous-pubescent throughout or glabrous except the petioles and base of blades; flowering stem scape-like, 4–7 cm. high, slender, villous or glabrous; bracts 2, linear, subtending the small umbel; rays simple, usually 1–3, 1–6 mm. long; involucre narrowly turbinate, the teeth oblong, not reflexed; calyx rose-colored, 4–5 mm. long, villous-pubescent, narrowed to a very short obscure stipe-like base; filaments glabrous; achenes pubescent on the angles to near the base.

Gravelly or sandy slopes, Hudsonian Zone; high volcanic peaks from Mount Stuart, Washington, to Mount Lassen, California. The Mount Shasta and Mount Lassen plants are nearly glabrous, while the plants from Crater Lake northward are villous-pubescent throughout (var. *coryphaeum*). Type locality: Mount Shasta, California. Aug.–Sept.

9. *Eriogonum latens* Jepson. Onion-flowered Eriogonum. Fig. 1357.

Eriogonum latens Jepson, Fl. Calif. 427. 1914.

Eriogonum monticola Stokes, Gen. Eriog. 123. 1936.

Caudex with short caespitose branches. Leaves short-pilose, the blades elliptic-obovate to deltoid-ovate, 15–25 mm. long, apiculate at apex, narrowed abruptly or gradually to a winged petiole of about the same length or longer; flowering stems scape-like; bracts subtending the inflorescence membranous, rose-colored; involucre few, sessile or subsessile, forming a head, campanulate, conspicuously membranous, 6–8 mm. long, sparsely pilose, the lobes oblong-ovate, becoming recurved; calyx cream-colored, pubescent below, without an evident stipe-like base, the lobes oblong-obovate; filaments hairy below; achene glabrous.

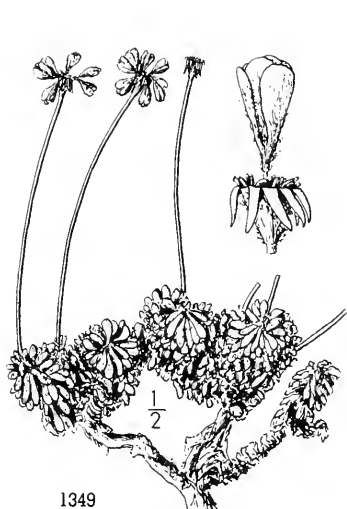
Talus slopes, Arid Transition and Canadian Zones; eastern slopes of Sierra Nevada and White Mountains, Inyo County, California, and adjacent Nevada. Type locality: Timosea Peak, altitude 6500 feet, Inyo County, California. July–Sept. The scarious rose-colored bracts and involucre suggest some of the wild onions.

10. *Eriogonum Kelloggii* A. Gray. Kellogg's Eriogonum. Fig. 1358.

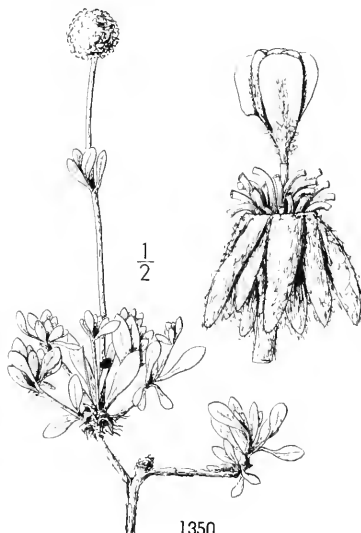
Eriogonum Kelloggii A. Gray, Proc. Amer. Acad. 8: 293. 1870.

Caudex caespitose forming low dense or loose mats, young branchlets loosely tomentose. Leaves oblanceolate to spatulate, narrowed to a short simple petiole, 1–3 mm. wide, silky-tomentose on both sides, sometimes less so above; flowering stem slender, 3.5–7 cm. long, bearing a whorl of foliaceous bracts at the middle; involucre solitary, narrowly turbinate. 5–6 mm. high, silky-tomentose, the teeth short, erect; calyx 4 mm. long in fruit, tinged with rose, glabrous; filaments 3 mm. long, hairy at base; achene conical, glabrous except at base of the styles, these 3 mm. long.

Dry ridges, Humid Transition and Canadian Zones; Red Mountain, northern Mendocino County, California. Type locality: fir woods, Red Mountain, Mendocino County, California. July–Aug.



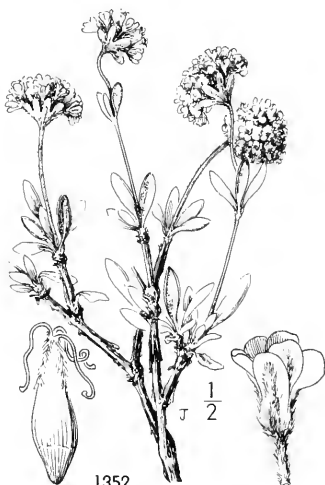
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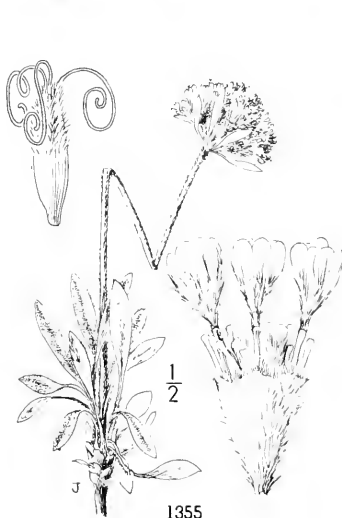
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1349. *Eriogonum caespitosum*
1350. *Eriogonum Douglasii*
1351. *Eriogonum tenue*

1352. *Eriogonum sphaerocephalum*
1353. *Eriogonum tripodum*
1354. *Eriogonum thymoides*

1355. *Eriogonum Piperi*
1356. *Eriogonum pyrolaeifolium*
1357. *Eriogonum latens*

11. *Eriogonum siskiyouense* Small. Siskiyou Eriogonum. Fig. 1359.

Eriogonum siskiyouense Small, Bull. Torrey Club 25: 44. 1898.

Eriogonum ursinum var. *siskiyouense* Stokes, Gen. Eriog. 114. 1936.

Cespitose perennial with short compact branches, forming low tufts or mats. Leaves 5–8 mm. long, oval to spatulate, acute or acutish, narrowed to a short petiole, glabrate above, tomentose beneath; scapes slender, 4–8 cm. high, with a whorl of 2–4 foliaceous bracts near the middle; involucre solitary, sparsely arachnoid-tomentose, campanulate, the tube 3.5–4 mm. long, the lobes reflexed, about as long as the tube; calyx yellow, glabrous, 5 mm. long, contracted to a short stipe-like base; filaments hairy at base; achene glabrous.

Mountain ridges, Boreal Zones; Siskiyou and Trinity Counties, California. Type locality: Scott Mountain, altitude 9,000 feet, Siskiyou County, California. Aug.–Sept.

12. *Eriogonum incanum* Torr. & Gray. Hoary Eriogonum. Fig. 1360.

Eriogonum incanum Torr. & Gray, Proc. Amer. Acad. 8: 161. 1870.

Caudex densely cespitose, forming mats, the young branchlets tomentose. Leaves densely hoary-tomentose on both surfaces, oblong or spatulate, 5–15 mm. long, obtuse at the apex, narrowed at base to a petiole of about equal length; flowering stem scapiform; bracts subtending the umbels lanceolate-subulate, 4–5 mm. long; umbel small, often subcapitate, the central involucre sessile, the outer on rays 2–12 mm. long or sometimes congested into a head; involucre broadly turbinate, 3 mm. high, the teeth ovate-triangular, erect or in age somewhat spreading; flowers polygamo-dioecious; calyx glabrous, pale lemon yellow, in the fertile flowers enlarged in fruit, usually tinged with red and bearing very short and sterile stamens, in the sterile ones remaining small (3 mm.), and bearing fertile stamens; filaments villous below; achene tomentulose at apex or usually glabrous; styles less than 0.5 mm. long, erect.

Rocky alpine ridges, Canadian and Hudsonian Zones; Sierra Nevada, from Lake Tahoe to Mount Whitney. Type locality: Tuolumne River, altitude 8,000–11,000 feet, Sierra Nevada, California. July–Sept.

13. *Eriogonum marifolium* Torr. & Gray. Marum-leaved Eriogonum. Fig. 1361.

Eriogonum marifolium Torr. & Gray, Proc. Amer. Acad. 8: 161. 1870.

Eriogonum cupulatum Stokes, Leaflets West. Bot. 1: 34. 1933.

Caudex much branched, forming loose mats, the young branchlets tomentose. Leaves oblong-ovate to broadly ovate, cuneate to nearly truncate at base, densely tomentose beneath, glabrate above, 8–15 mm. long, petiole of about equal length; flowering stem scapiform, sparsely tomentose; 5–20 cm. high; bracts subtending the umbel linear-subulate, 3–8 mm. long; central ray often sessile or at least shorter than the others, lateral rays several, short, forming congested umbel in anthesis, elongated, often 2–3 cm., in fruit; involucre 2.5 mm. long, the teeth short and broad; calyx lemon yellow, often tinged with red along median line in age, becoming 3–4 mm. long; filaments 1 mm. long, hairy below; achene glabrous, conical; styles scarcely 0.5 mm. long, nearly erect.

Sandy and gravelly slopes, Boreal Zones; Cascade Mountains, central Oregon, to the central Sierra Nevada, California. Type locality: Mount Shasta, California. June–Sept. This species is dioecious, the pistillate plants having longer peduncles, and a brighter yellow and larger calyx.

14. *Eriogonum ursinum* S. Wats. Bear Valley Eriogonum. Fig. 1362.

Eriogonum ursinum S. Wats. Proc. Amer. Acad. 10: 347. 1875.

Caudex woody, short-branched and cespitose. Leaves ovate, 8–10 mm. long, abruptly narrowed to a short petiole, densely white-tomentose beneath, sparsely tomentose and often becoming glabrate above, obtuse or commonly acute at apex and slightly apiculate; flowering stems stout, 20–40 cm. high, villous-tomentose; bracts foliaceous, subtending the compressed umbels, with smaller more slender ones subtending the forks; involucre sometimes crowded into a simple head-like umbel, villous, the teeth short and dentate; calyx ochroleucous, glabrous without, villous within, the stipe-like base about 1 mm. long; filaments densely woolly-villous; achene glabrous or very sparsely pubescent at apex; styles 2.5–3 mm. long, very sparsely short-pubescent at base or glabrous.

Rocky ledges, Canadian Zone; northern Sierra Nevada, California. Type locality: Long and Bear Valleys, Plumas County, California. June–Sept.

15. *Eriogonum ternatum* Howell. Waldo Eriogonum. Fig. 1363.

Eriogonum ternatum Howell, Fl. N.W. Amer. 570. 1902.

Eriogonum ursinum var. *confine* Stokes, Gen. Eriog. 114. 1936.

Caudex woody, cespitose, clothed with the old leaf bases. Leaves obovate to spatulate or oblong, obtuse, 10–15 mm. long, narrowed to slightly winged petioles about as long or longer than the blades, densely white-tomentose beneath, less so above, or in age a few glabrate; flowering stem 10–30 cm. high, scape-like, tomentose; bracts 4 or 5, foliaceous, subtending the 3–4 rays, the lateral rays with 3–4 small bracts subtending the involucre; involucre funnelform, 6–7 mm. high, white-tomentose, the teeth ovate-triangular, about 2 mm. long; calyx sulphur yellow, glabrous without and within; filaments densely woolly-villous below, 3.5 mm. long; achenes sparsely pilose above on the angles; styles 3–3.5 mm. long, villous below.

Gravelly and rocky soils, Arid Transition Zone; Josephine County, Oregon, and adjacent Del Norte and Siskiyou Counties, California. Type locality: "On gravelly bars along streams near Waldo, Southern Oregon." June–Aug.

16. *Eriogonum heracleoides* Nutt. Parsnip-flowered Eriogonum. Fig. 1364.

Eriogonum heracleoides Nutt. Journ. Acad. Phila. 7: 49. 1834.
Eriogonum heracleoides var. *minus* Benth. in DC. Prod. 14: 11. 1856.
Eriogonum angustifolium Nutt. Journ. Acad. Phila. 11: 1: 164. 1847.
Eriogonum Johnstonii Stokes, Leaflets West. Bot. 1: 35. 1933.

Caudex loosely tufted. Leaves oblanceolate to linear, 2–5 cm. long, densely white-floccose beneath, less so above, attenuate at base; petiole short; flowering stem 2–4 dm. high, floccose, with a whorl of foliaceous bracts near the middle or in depauperate forms these sometimes reduced to a single leaf or entirely absent; umbel simple or compound, subtended by a whorl of foliaceous bracts; rays 2–5 cm. long; involucre turbinate, the tube 3 mm. long; calyx 5–6 mm. long, the stipe-like tube often 2 mm.; filaments conspicuously villous below; achenes pubescent at apex.

Rocky or gravelly slopes and ridges, Arid Transition and Canadian Zones; British Columbia southeast of the Cascade Mountains through Washington and Oregon to Warner Mountains, California, east to Montana and Utah. Type locality: "sources of the Missouri," collected by Wyeth. June–Aug.

17. *Eriogonum umbellatum* Torr. Sulphur-flowered Eriogonum. Fig. 1365.

Eriogonum umbellatum Torr. Ann. Lyc. N. Y. 2: 241. 1828.
Eriogonum modocense Greene, Pittonia 5: 68. 1902.

Caudex with a few short branches, leafy at the tips. Leaves obovate-spatulate, 10–25 mm. long, tapering to a petiole of about equal length, white-tomentose beneath, green and glabrate above. Flowering stem scapiform, rather stout, 10–30 cm. high, floccose; umbel simple subtended by several oblanceolate foliaceous bracts; rays usually 5–10, 2–5 cm. long, rarely longer, bractless; involucre turbinate, tomentose, the tube 3–4 mm. long, the lobes reflexed, oblong-linear, usually 20–30 flowered; calyx glabrous, bright yellow, the lobes spatulate, obtuse at apex, the tube stipe-like below; achenes sharply 3-angled, sparsely hairy at the apex.

Dry slopes and ridges, Arid Transition and Boreal Zones; Washington to northern California, Montana, and Colorado. A variable species with many local variations, and many segregates have been proposed. Type locality: "Near the Rocky Mountains." Collected by James. June–Sept.

Eriogonum umbellatum subsp. *majus* Benth. ex Piper, U.S. Nat. Herb. 11: 238. 1906. (*E. umbellatum* subsp. *subalpinum* (Greene) Stokes.) Much like the typical species in habit but flowers cream-colored. Cascade Mountains, Washington, to Montana and Colorado.

Eriogonum umbellatum var. *stellatum* (Benth.) M. E. Jones, Contr. West. Bot. No. 11: 5. 1903. (*E. stellatum* Benth. *E. croceum* Small.) Umbels compound and the primary rays bearing bracts at the base of the secondary rays. Basal leaves with elongated slender petioles, glabrate above. Blue Mountains, Oregon (type locality), to southern Nevada and adjacent California.

Eriogonum umbellatum var. *bahiaeforme* (S. Wats.) Jepson, Fl. Calif. 425. 1914. (*E. stellatum* var. *bahiaeforme* S. Wats. *E. trichotomum* Small.) Rays bearing bracts, and mostly compound. Leaves with petioles scarcely as long as the blades and in the typical form tomentose on both surfaces. Coast Ranges and southern Sierra Nevada foothills to San Bernardino Mountains, California.

Eriogonum umbellatum subsp. *polyanthum* (Benth.) Stokes, Gen. Eriog. 108, 111. 1936. Caudex usually much branched. Leaves mostly elliptic-ovate, rather abruptly narrowed at base and longer than the petiole; umbel simple or rarely one or two rays forked; involucre often 10–50 flowered; calyx bright yellow, sometimes tinged with rose in age. The common representative of the species in the Pacific States, especially in southern Oregon and California. *E. montanum* Howell, *E. ovatum* Greene, *E. Torreyanum* A. Gray, *E. reclinatum* Greene are all forms of this.

Eriogonum umbellatum var. *minus* Johnston, Bull. S. Calif. Acad. 17: 64. 1918. (*Eriogonum minus* Ewan, Bull. Torrey Club 64: 515. 1937.) Dwarf alpine perennial, the caudex much branched forming mats; densely white-silky throughout. Leaves suborbicular, 5–10 mm. broad; petioles mostly shorter than the blades; flowering spikes 3–6 cm. high; bracts broadly ovate- or obovate-orbicular; rays 1–2 cm. long; involucre broadly turbinate, 2 mm. long, the lobes ovate-oblong, about as long as the tube; calyx wine red or yellow tinged with red, 4–5 mm. long, glabrous, the lobes oblong-obovate, rather abruptly narrowed at base, the stipe-like tube 1 mm. long, filaments hairy below; achene villous to near the base; styles villous, 4–5 mm. long. Granitic rocks and gravel, Boreal Zones; summits of the high peaks, San Gabriel to San Jacinto Mountains, southern California. *E. Covillei* Small and *E. polycladon* Small are dwarf forms somewhat intermediate between this and the subspecies *polyanthum*.

18. *Eriogonum compósitum* Dougl. Composite Eriogonum. Fig. 1366.

Eriogonum compositum Dougl. ex Benth. Trans. Linn. Soc. 17: 410. 1837.

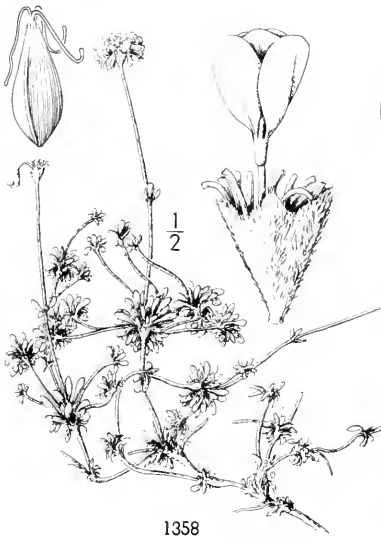
Perennial with a deep woody root and short few-branched crown. Leaves all basal, the blades ovate or long-ovate and cordate at base to oblong-lanceolate and acutish at base, 3–10 cm. long, densely white-tomentose beneath, thinly tomentose or glabrate above, the petioles longer than the blades; flowering stem stout, 20–45 cm. high, scapiform, glabrous or nearly so; bracts subtending the umbel, foliaceous, linear to oblanceolate, 10–25 mm. long; umbels mostly compound, 15–30 mm. long, secondary and tertiary umbels subtended by linear bracts; involucre glabrate or pilose-tomentose, the lobes linear, at length reflexed; calyx pale yellow, glabrous, with a stipe-like base, 5–6 mm. long in age; filaments glabrous, 3 mm. long; achene pilose above, 6 mm. long; styles curled back in the achene, 2–3 mm. long.

Dry hillsides and plains, Upper Sonoran and Transition Zones; Washington (mainly eastern) to northern California and Idaho. Type locality: Columbia River, Washington. May–July. Several varieties have been proposed based upon leaf shape and pubescence.

19. *Eriogonum Lobbii* Torr. & Gray. Lobb's Eriogonum. Fig. 1367.

Eriogonum Lobbii Torr. & Gray, Proc. Amer. Acad. 8: 162. 1870.
Eriogonum robustum Greene, Bot. Gaz. 1: 126. 1885.

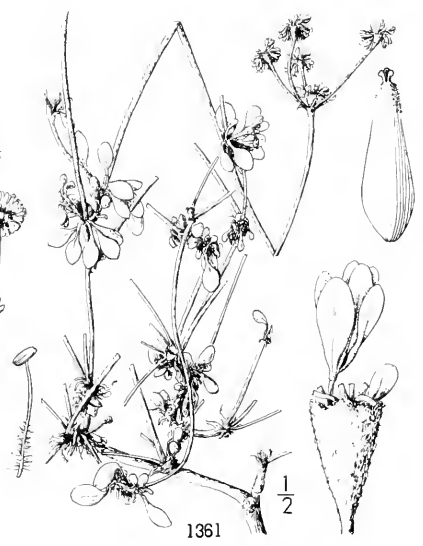
Caudex short, stout and simple or with a few stout branches, clothed with old leaf bases. Leaves forming tufted rosettes at the ends of the caudex branches, the blades round-oval to ovate or obovate, 2–4 cm. long, plane, rather abruptly narrowed to a petiole as long or longer; peduncles



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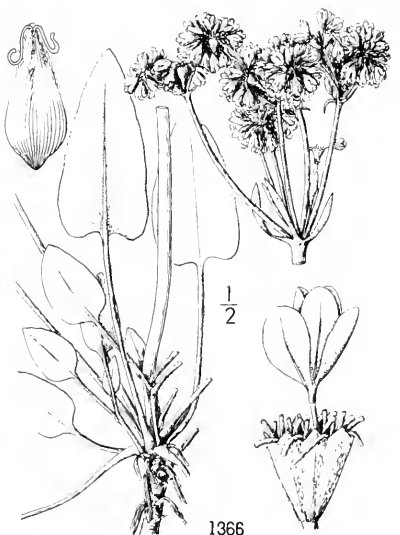
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1358. *Eriogonum Kelloggii*

1359. *Eriogonum siskiyouense*

1360. *Eriogonum incanum*

1361. *Eriogonum marifolium*

1362. *Eriogonum ursinum*

1363. *Eriogonum ternatum*

1364. *Eriogonum heracleoides*

1365. *Eriogonum umbellatum*

1366. *Eriogonum compositum*

usually several, decumbent, rather stout, 6–20 cm. long; bracts foliaceous, oblong-linear, subtending the rays of the umbel; rays 2–6, 15–30 mm. long, stout and white-woolly, usually with a whorl of small bracts near the middle; involucre tube turbinate, 5–10 mm. long, the lobes as long, reflexed; calyx white or pinkish, often turning deep rose in age, 5–7 mm. long, merely narrowed at base but not stipe-like, glabrous; achene glabrous; styles slender, weak, 2 mm. long; filaments 5 mm. long, hairy at base.

Rocky and gravelly soils, Boreal Zones; Siskiyou County south to Lake and Mariposa Counties, California, and western Nevada. Type locality: collected by Lobb, probably in the northern Sierra Nevada. July–Sept.

20. *Eriogonum gracillimum* S. Wats. Slender Eriogonum. Fig. 1368.

Eriogonum gracillimum S. Wats. Bot. Calif. 2: 480. 1880.

Eriogonum variabile Heller, Muhlenbergia 2: 24. 1905.

Eriogonum angulosum var. *victorense* M. E. Jones, Contr. West. Bot. No. 12: 74. 1908.

Eriogonum angulosum subsp. *gracillimum* Stokes, Gen. Eriog. 38. 1936.

Annual, diffusely dichotomously branched from the base, 10–45 cm. high, more or less floccose, the branches usually angled and the ultimate very slender. Basal leaves oblanceolate, 3–5 cm. long, densely white-woolly below, lower stem leaves oblong-lanceolate, the margins revolute and crisped; upper leaves reduced to foliaceous bracts; peduncles filiform, often recurved, 1–4 cm. long, glabrous; involucre turbinate, 2 mm. high, the lobes ovate-triangular, obtuse; calyx rose-colored tipped with white, 2 mm. long; outer lobes oblong, rounded at apex, usually crenulate, the inner similar but slightly smaller.

Sandy or gravelly slopes and washes, Sonoran Zones; South Coast Ranges, San Benito County and Upper San Joaquin Valley, California, to northern Lower California, east to Nevada and Arizona. Type locality: Mojave Desert, California. April–Sept.

21. *Eriogonum angulosum* Benth. Angle-stemmed Eriogonum. Fig. 1369.

Eriogonum angulosum Benth. Trans. Linn. Soc. 17: 406. pl. 18. f. 1. 1837.

Annual, dichotomously branched from near the base and woolly-tomentose throughout, the branches more or less angled, 5–30 cm. high, often spreading. Basal leaves oblanceolate to oblong-oblanceolate, narrowed to a short petiole, 2–4 cm. long, revolute and crisped on the edges, stem leaves sessile, lanceolate; peduncles arising from most of the axils, very slender, pedicel-like, 1–2 cm. long, glabrous or sparsely tomentose; involucre campanulate-turbinate, 2–3 mm. high, puberulent or sometimes glabrous, the lobes rounded, about as broad as long; bractlets broad, spatulate, puberulent and sometimes tomentose; flowers many; stipules triangular-subulate, brown and scarious; calyx rose-colored tipped with white; outer lobes ovate-elliptic, deeply concave, short-clawed; inner lobes sessile, narrowly spatulate, a little enlarged near the base; achene 1.5 mm. long.

Dry sandy soils, mainly Lower Sonoran Zone; Coast Ranges from Alameda County and foothills of the southern Sierra Nevada to San Diego, California. Type locality: California (Douglas). Probably collected in the South Coast Ranges. May–Oct. Nun's Veiling.

Eriogonum angulosum var. *maculatum* (Heller) Jepson, Fl. Calif. 405. 1914. (*E. viridescens* Heller.) Basal leaves oblong to elliptic-obovate, obtuse or rounded at apex; calyx glandular without with almost sessile glands, usually yellow with a conspicuous rose-purple spot on the outer lobes, these much shorter than the much narrowed inner one, and their claws much shorter than in the typical species; achenes 1–1.25 mm. long, many, the body shorter than the beak. This variety inhabits the desert regions, ranging from southeastern Oregon to the deserts of southern California, western Arizona, and northern Lower California.

Eriogonum bidentatum Jepson, Madroño 1: 115. 1923. Described from autumnal and winter stages, when the flowers and rosettes have all matured and form a conspicuous rounded head; and the outer calyx-lobes more conspicuously cucullate. Such stages are found in typical *E. angulosum* and in the variety *maculatum*.

22. *Eriogonum gossypinum* Curran. Cotton Eriogonum. Fig. 1370.

Eriogonum gossypinum Curran, Bull. Calif. Acad. 1: 274. 1885.

Annual, the stems dichotomously branched from the base and diffuse, 3–20 cm. high, woolly-tomentose. Basal leaves oblanceolate to obovate, obtuse or rounded at the apex, narrowed to the petiole, 1.5–4 cm. long; stem leaves lanceolate, sessile or subsessile, acute; peduncles almost filiform, 2–15 mm. long; involucre turbinate, 3 mm. high, 5-lobed to near the middle, glabrous without, densely and conspicuously clothed within with long cotton-like tomentum; flowers few, concealed in the dense cotton; calyx 1.5–2 mm. long, puberulent, the lobes all similar, linear-oblong, acute; achene 3-angled.

Dry plains, Lower Sonoran Zone; Upper San Joaquin Valley, California. Type locality: near Bakersfield. April–June.

23. *Eriogonum spergulinum* A. Gray. Spurry Eriogonum. Fig. 1371.

Eriogonum spergulinum A. Gray, Proc. Amer. Acad. 7: 389. 1868.

Oxytheca spergulina Greene, Fl. Fran. 153. 1891.

Oxytheca Reddingiana M. E. Jones, Bull. Torrey Club 9: 32. 1882.

Slender annual, the stem simple to the first node, rarely with one or two lateral basal branches, repeatedly dichotomously branched above, 1–3 dm. high, sparsely glandular with tack-shaped glands. Basal leaves 2–3 cm. long, narrowly linear, narrowed to a short petiole, hispid, those of the lower nodes similar but smaller, those of the upper reduced to 2 or 3 short bracts; peduncles filiform, 4–12 mm. long; involucre solitary, simulating a calyx, 0.5–1 mm. high, 4-lobed to below the middle; flower solitary, short-pedicelled; calyx white, veined with rose, 1 mm. long, puberulent without; lobes oblong, the outer obtuse, the inner erose; achene lenticular or obovoid.

Dry sandy or gravelly flats, Arid Transition and Canadian Zones; Idaho and eastern Oregon to Nevada, southern Sierra Nevada and Mount Pinos, California. Type locality: Big Creek, near Mariposa Grove, California. June–Aug.

24. *Eriogonum hirtiflorum* A. Gray. Hairy-flowered Eriogonum. Fig. 1372.

Eriogonum hirtiflorum A. Gray ex S. Wats. Proc. Amer. Acad. 12: 259. 1877.
Oxytheca hirtiflora Greene, Fl. Fran. 153. 1891.

Low dichotomously branching annual, 5–15 cm. high, the branches sparsely glandular. Leaves broad, obovate to spatulate-oblong, 1–2.5 cm. long, 4–8 mm. wide, narrowed from the rounded apex to the winged petiole, ciliate on the margins, otherwise nearly or quite glabrous; bracts 3-parted, the segments linear-oblong; involucre on short very slender pedicel-like peduncles, or sessile in the forks, scarcely 1 mm. long; flowers 2, exserted on a short pedicel; calyx barely 2 mm. long, the lobes pubescent on the back with hooked hairs, oblong, reddish; achene slightly exserted.

Dry gravelly soil, Arid Transition Zone; North Coast Ranges and the Sierra Nevada, California. Type locality: "Collected by Dr. Gray, 1872, probably in the mountains of California." June–Oct.

25. *Eriogonum inermis* (S. Wats.) Jepson. Unarmed Eriogonum. Fig. 1373.

Oxytheca inermis S. Wats. Proc. Amer. Acad. 12: 273. 1877.
Eriogonum vagans S. Wats. Proc. Amer. Acad. 20: 370. 1885.
Eriogonum inermis Jepson, Fl. Calif. 406. 1914.

Annual, the stem simple to the first node or rarely with 2 or 3 basal branches, then repeatedly dichotomously branched, the branches usually widely divergent, 5–30 cm. high, sparingly glandular with stipitate glands. Basal leaves spatulate, 12–25 mm. long, 4–8 mm. broad, ciliate on the margins, otherwise glabrous; bracts herbaceous, deeply 3-lobed, sparsely hirsutulose; branches few and stouter than in the preceding; involucre in the axils of the bracts on pedicel-like peduncles 0.5–2 mm. long, deeply 4-lobed, 1.5 mm. long, 3–4-flowered; calyx hirsutulose with hooked hairs, the lobes oblong, 1.5 mm. long, equaling or slightly shorter than the achene.

Dry barren soils, Upper Sonoran and Arid Transition Zones; from Mount Diablo south in the Coast Ranges, and from the southern Sierra Nevada to the San Bernardino Mountains, California. Type locality: "California, probably on Mt. Diablo." June–Aug.

26. *Eriogonum apiculatum* S. Wats. San Jacinto Eriogonum. Fig. 1374.

Eriogonum apiculatum S. Wats. Proc. Amer. Acad. 17: 378. 1882.

Erect annual, simple at base, 2–9 dm. high, dichotomously branched, the branches few to many, ascending, the ultimate very slender, lower portion of internode slightly glandular. Basal leaves spatulate-oblong to -obovate, 1.5–3 cm. long, ciliate and somewhat pilose; bracts triangular or triangular-lanceolate, 1–2 mm. long; peduncles almost filiform, 4–25 mm. long; involucre 1.5 mm. long, 4-lobed almost to the middle, the lobes rounded at apex, 2–3-flowered; calyx white, the lobes oblong-obovate, 2 mm. long, apiculate and often emarginate, puberulent.

Dry open places, Arid Transition Zone; San Jacinto, Palomar and Cuyamaca Mountains, southern California. Type locality: San Jacinto Mountains. July–Aug.

27. *Eriogonum Parishii* S. Wats. Parish's Eriogonum. Fig. 1375.

Eriogonum Parishii S. Wats. Proc. Amer. Acad. 17: 379. 1882.

Annual with erect stems 1–3 dm. high, repeatedly dichotomously branched above the first internode forming a dense rounded crown, the ultimate branchlets filiform but firm, glabrous except for scattering stipitate glands above the nodes. Leaves all basal, spatulate, 1.5–5 cm. long, hirsute; bracts 3, triangular-subulate, glabrous; peduncles filiform, straight, 4–12 mm. long; involucre solitary, less than 1 mm. long, 5-lobed, 1- or rarely 2-flowered; calyx rose-colored, 0.5–0.7 mm. long, minutely puberulent, outer lobes ovate, the inner oblong-spatulate; achene slightly exserted.

Gravelly places, Upper Sonoran and Arid Transition Zones; San Gabriel and San Bernardino Mountains, California, to northern Lower California. Type locality: Bear Valley, San Bernardino Mountains, California. July–Sept.

28. *Eriogonum trichopes* Torr. Yellow or Little Trumpet. Fig. 1376.

Eriogonum trichopes Torr. in Emory, Notes Mil. Rec. 151. 1848.
Eriogonum trichopodum Torr. ex Benth. in DC. Prod. 14: 20. 1856.
Eriogonum clavatum Small, Bull. Torrey Club 25: 50. 1898.

Erect annual, 1–4 dm. high, usually simple below, the first internode 2.5–12 cm. long, sometimes somewhat inflated above, branched above this repeatedly, the ultimate branchlets nearly filiform, glabrous, or sparsely glandular above the nodes. Basal leaves suborbicular, 1–2 cm. broad, cordate at base, crenate or rarely entire, pilose beneath, less so above; petioles slender, 1–2.5 cm. long, pilose; bracts triangular-subulate, those at the first node more or less pubescent; peduncles capillary, 5–15 mm. long; involucre turbinate, 0.75 mm. long, 4-lobed, glabrous, few-flowered; calyx hispidulose, yellow or greenish, 1 mm. long in flower, 2.5 mm. in fruit, the lobes similar, narrowly ovate; achene 2 mm. long, included.

Sandy desert slopes and washes, Lower Sonoran Zone; Inner Coast Ranges and foothills of the southern Sierra Nevada and Mojave and Colorado Deserts, California to Utah, New Mexico, Lower California, and Sonora. Type locality: mountains on the west side of the Colorado Desert, along the old San Felipe route, California. March–July.

29. *Eriogonum Ordii* S. Wats. Ord's Eriogonum. Fig. 1377.

Eriogonum Ordii S. Wats. Proc. Amer. Acad. 21: 468. 1886.
Eriogonum tenuissimum Eastw. Proc. Calif. Acad. IV. 20: 139. 1931.

Slender annual, the stem erect, 2.4 dm. high, simple below, tri- or dichotomously branched

above, the ultimate branchlets capillary, loosely floccose-tomentose toward the base, glabrous above. Basal leaves several, obovate to oblanceolate, 5–8 cm. long, obtuse or rounded at apex, narrowed to a petiole equaling or exceeding the blade, glabrous; bracts on the first and often the second nodes foliaceous, the upper subulate and much reduced; involucre solitary on capillary peduncles 5–20 mm. long, turbinate, 1–2 mm. long, 4-toothed, glabrous, 1–3-flowered; calyx white tinged with pink in age, pubescent, the lobes oblong or oblong-ovate.

Dry slopes, Lower Sonoran Zone; Inner Coast Ranges, San Benito County, and northern base of the Tehachapi Mountains, Kern County, to Split Mountain, Colorado Desert, California, and Fort Mojave, Arizona. Type locality: Fort Mojave, Arizona. March–May.

30. *Eriogonum inflatum* Torr. & Frem. Desert Trumpet. Fig. 1378.

Eriogonum inflatum Torr. & Frem. in Frem. Second Rep. 317. 1845.

Eriogonum glaucum Small, Bull. Torrey Club 25: 51. 1898.

Eriogonum inflatum var. *deflatum* Johnston, Proc. Calif. Acad. IV. 12: 1013. 1924.

Eriogonum lagunense M. E. Jones, Contr. West. Bot. No. 18: 34. 1933.

Perennial from a stout somewhat woody root, stems one or few from a simple or branched crown, erect, 3–8 dm. high, glaucous and glabrous, the lower internode elongated, stout and more or less inflated above the middle, the upper portion tri- or dichotomously branched into broad open panicles. Basal leaves rounded or reniform to oblong-elliptic, usually cordate at base, undulate, 10–25 mm. long, prominently veined beneath, hirsute beneath, sparsely so above, the petioles as long to twice as long as the blades; peduncles capillary, becoming straight and rigid, 5–20 mm. long; involucre broadly turbinate, 1.5 mm. long, 5-lobed to near the middle, the lobes with scattering stipitate glands; flowers usually 10–20, their pedicels stipitate-glandular, rather stout; calyx yellow or the lobes with reddish-brown midribs, conspicuously pubescent on the back, 2–2.5 mm. long in fruit, outer lobes ovate, the inner ovate-lanceolate, acute; achene 2 mm. long, triquetrous, the angles almost winged above.

Sandy or rocky ground, Lower Sonoran Zone; Mojave and Colorado Deserts, California, to Lower California, east through the desert regions to Nevada, Utah, and Arizona. Type locality: "On barren hills in the lower part of North California." March–July.

31. *Eriogonum esmeraldense* S. Wats. Esmeralda Eriogonum. Fig. 1379.

Eriogonum esmeraldense S. Wats. Proc. Amer. Acad. 24: 85. 1889.

Annual, the stem solitary or rarely 2–4 from the base, glabrous, repeatedly branched, the branches mostly ascending forming a rounded or obovoid crown, 1–3 dm. high, ultimate branchlets almost capillary. Leaves basal, broadly obovate to round-obovate, 6–15 mm. long, pilose-hispid especially on the veins, margins, and petioles; peduncles filiform, spreading or reflexed, 5–15 mm. long; involucre narrowly turbinate, 1 mm. long, 5-lobed to near the middle; flowers 2–5, glabrous, white or pink; outer calyx-lobes oblong or oblong-spatulate, obtuse or retuse, the inner similar.

Gravelly slopes, Upper Sonoran and Transition Zones; eastern slopes of Sierra Nevada and White Mountains, Inyo County, California, to Nevada. Type locality: Candelaria, Esmeralda County, Nevada. July–Sept.

32. *Eriogonum Thomasi* Torr. Thomas' Eriogonum. Fig. 1380.

Eriogonum Thomasi Torr. Pacif. R. Rep. 5: 364. 1857.

Eriogonum minutiflorum S. Wats. Proc. Amer. Acad. 26: 125. 1891.

Annual, the stems solitary or sometimes 2–4, intricately branched above the first elongated internode into a broad crown, 1–3 dm. high, glandular at base, otherwise glabrous throughout, ultimate branchlets filiform. Basal leaves rounded to broadly oval, 8–12 mm. long, rounded at apex, often subcordate at base, white-woolly on both surfaces or sometimes glabrate above, the petioles about twice as long; bracts glabrous; peduncles filiform, divergent or slightly recurved, 5–15 mm. long; involucre turbinate-campanulate, scarcely 1 mm. high, 5-lobed, glabrous, several-flowered; calyx at first yellow becoming deep rose or the lobes white with rose midrib, barely 1.5 mm. long, short-pubescent, the outer lobes saccate on either side of the cordate base, the inner oblong-spatulate; stamens included.

Washes and sandy places of the deserts, Lower Sonoran Zone; Inyo County to the Mojave and Colorado Deserts, California, Nevada, southern Utah, and Arizona. Type locality: near Fort Yuma, Arizona. Feb.–June.

33. *Eriogonum Thúrberi* Torr. Thurber's Eriogonum. Fig. 1381.

Eriogonum Thurberi Torr. Bot. Mex. Bound. 176. 1859.

Eriogonum Thurberi var. *Parishii* Gandoger, Bull. Soc. Bot. Belg. 42: 198. 1906.

Eriogonum cernuum subsp. *Thurberi* Stokes, Gen. Eriog. 42. 1936.

Eriogonum cernuum subsp. *viscosum* Stokes, Gen. Eriog. 42. 1936.

Annual, stems solitary or several, 1–4 dm. high, diffusely branched, loosely floccose-tomentose below, glabrous or sparingly glandular above. Leaves all basal, oblong-ovate, 1–3 cm. long, densely white-woolly beneath, less so or glabrate above, often crisped; petioles 1–3 cm. long; bracts more or less glandular without and tomentose within; peduncles capillary, 5–25 mm. long, erect; involucre broadly turbinate, 2 mm. high, somewhat glandular-puberulent, 5-lobed to the middle; calyx rose, margined with white, 1.5 mm. long, glandular-puberulent near the base, outer lobes rounded or broader than long, abruptly narrowed to a short claw-like base, with a tuft of white hairs within near the base, the inner narrowly lanceolate.

Sandy washes and benches, Lower Sonoran Zone; cismontane, Los Angeles County, California, to northern Lower California, east to western Arizona. Type locality: "Sandy ravines, San Pasqual, California." March–June.



1367



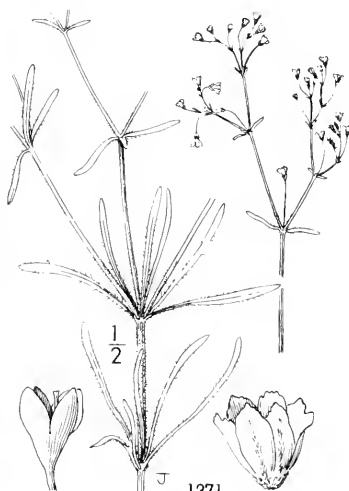
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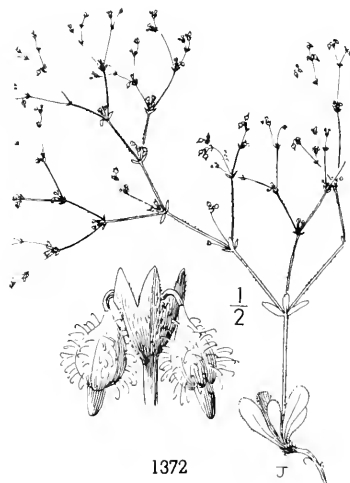
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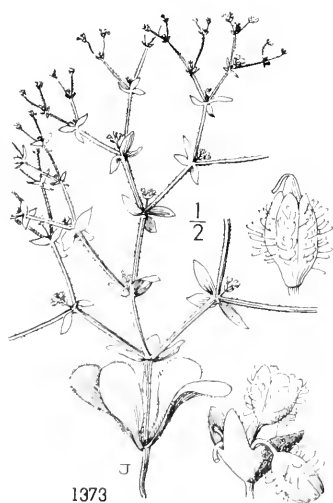
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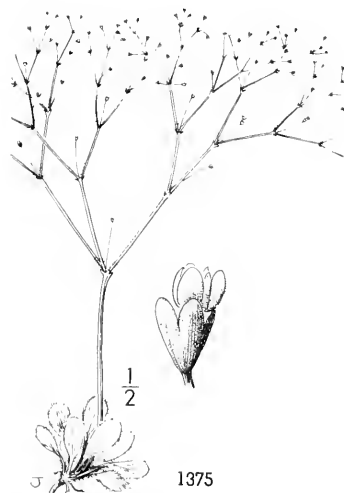
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1367. *Eriogonum Lobbii*
 1368. *Eriogonum gracillimum*
 1369. *Eriogonum angulosum*

1370. *Eriogonum gossypinum*
 1371. *Eriogonum spergulinum*
 1372. *Eriogonum hirtiflorum*

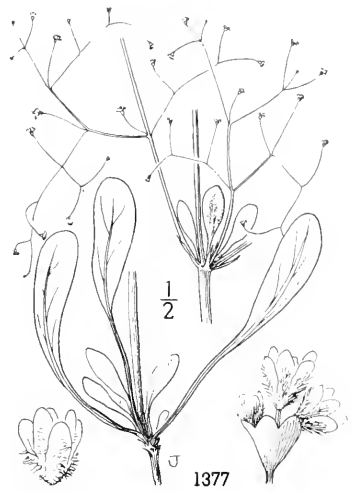
1373. *Eriogonum inerme*
 1374. *Eriogonum apiculatum*
 1375. *Eriogonum Parishii*



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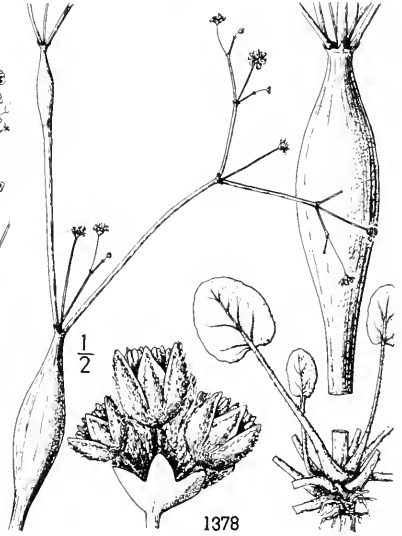
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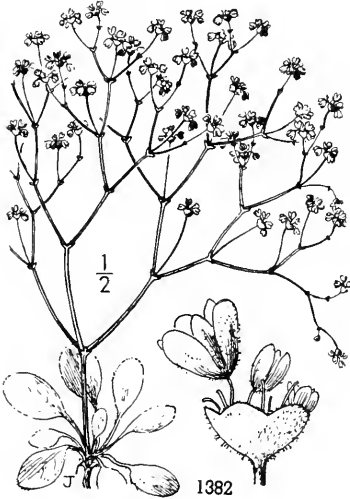
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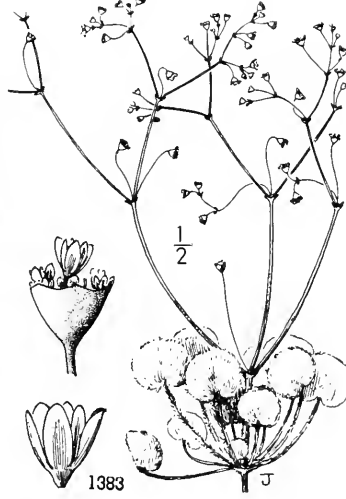
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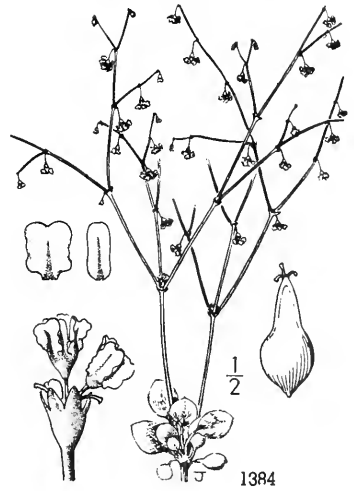
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1376. *Eriogonum trichopes*
1377. *Eriogonum Ordii*
1378. *Eriogonum inflatum*

1379. *Eriogonum esmeraldense*
1380. *Eriogonum Thomasii*
1381. *Eriogonum Thurberi*

1382. *Eriogonum pusillum*
1383. *Eriogonum reniforme*
1384. *Eriogonum cernuum*

34. *Eriogonum pusillum* Torr. & Gray. Puny Eriogonum. Fig. 1382.*Eriogonum pusillum* Torr. & Gray, Proc. Amer. Acad. 8: 184. 1870.*Eriogonum reniforme* subsp. *pusillum* Stokes, Gen. Eriog. 36. 1936.

Annual with dichotomously or trichotomously branched glabrous stems, 1–3 dm. high. Basal leaves oblong-ovate or rarely rounded, rounded at apex and commonly acute at base, 1–3 cm. long, densely white-woolly beneath, thinly so and green above, petioles about twice as long; bracts glandular-pubescent; peduncles very slender; involucre broadly turbinate, 1.5 mm. long, glandular-pubescent, 5-lobed, the lobes broad, rounded, several-flowered; calyx 1.5 mm. long in flower, 2.5 mm. in fruit, glandular-puberulent; lobes yellow with broad red-brown midrib, the outer oblong-elliptic in flower, becoming oblong-spatulate in fruit, the inner similar but a little narrower; stamens included.

Granitic sand and gravel, Sonoran Zones; desert regions of Inyo County to the Mojave Desert, California, and western Nevada. Type locality: "Foothills of the Trinity Mountains, borders of the Truckee Desert, Nevada." March–July. Yellow Turban.

35. *Eriogonum reniforme* Torr. & Frem. Kidney-leaved Eriogonum. Fig. 1383.*Eriogonum reniforme* Torr. & Frem. in Frem. Second Rep. 317. 1845.

Annual, the stems 1 or 2, erect, or often with several divergent branches from or near the base, 5–20 cm. high, divergently branched with a broad panicle, glabrous above, thinly floccose-tomentose toward the base. Leaves in a basal rosette, reniform, 8–20 mm. broad, densely white-tomentose below, thinly so above; petioles slender, tomentose; peduncles 5–15 mm. long, capillary; involucre barely 2 mm. long, broadly turbinate, shallowly 5-lobed, the lobes rounded, glabrous; flowers several; bractlets spatulate, loosely hairy at the apex; calyx 1 mm. long in flower, glandular-puberulent, the outer lobes elliptic-ovate, the inner a little narrower, pale yellow with a broad greenish or reddish-brown midrib, in fruit 1.5–2 mm. long, and the lobes oblong-ovate, often rose-tinged.

Sandy or rocky soils, Lower Sonoran Zone; desert ranges of Inyo County to the Colorado Desert, California, and western Nevada. Type locality: said to have been collected on the Sacramento River, but probably on the Mojave Desert, California. March–June.

36. *Eriogonum cernuum* Nutt. Nodding Eriogonum. Fig. 1384.*Eriogonum cernuum* Nutt. Journ. Acad. Phila. II. 1: 162. 1848.

Annual, the stems slender, glabrous, 1–4 dm. high, dichotomously or trichotomously branched, the ultimate branches very slender. Leaves basal, rounded or round-ovate, 1–2 cm. long, densely white-tomentose beneath, less so and often glabrate above; petioles slender, 2–4 cm. long, peduncles capillary, more or less strongly deflexed, 4–25 mm. long, glabrous; involucre narrowly turbinate, scarcely 2 mm. high, glabrous, 5-lobed, the lobes hyaline-margined; bractlets conspicuously white-woolly; pedicels glabrous; calyx white tinged with rose, the midribs of the lobes often greenish or purplish, glabrous, scarcely 2 mm. long in fruit, the tube attenuate at base, outer lobes obovate or oblong-quadrate, not cordate at base, the inner narrower; achene distinctly beaked, 1.5 mm. long.

Sandy or alkaline soils, Upper Sonoran Zones; eastern Oregon to the Mojave Desert, California, east to Nebraska and New Mexico. Type locality: "On the plains of the Oregon and in the Rocky Mountains." June–Sept.

Eriogonum nütans Torr. & Gray, Proc. Amer. Acad. 8: 181. 1870. Annual, the stems 1–2 dm. high, divaricately branched, the angle of branching broad, glabrous or the upper branches sometimes glandular-puberulent. Leaves basal, rounded, 10–15 mm. long, cordate or subcordate at base, densely white-tomentose on both surfaces or sometimes glabrate above; petioles as long or longer than the leaves; peduncles spreading and more or less recurved or deflexed, 3–15 mm. long, glandular-puberulent; involucre campanulate, about 3 mm. long; bractlets glandular-puberulent; calyx rose-colored or white, 2–3 mm. long, obtuse at base, outer lobes oblong or oval, not cordate at base. Gravelly slopes, Transition and Sonoran Zones; western Nevada to Utah, reported from Lassen County, California.

37. *Eriogonum deflexum* Torr. Flat-crown Eriogonum. Fig. 1385.*Eriogonum deflexum* Torr. in Ives Rep. 24. 1860.

Annual, the stems solitary or several from the base, 2–4 dm. high, divaricately and often intricately branched into a wide spreading flat-topped crown, pale green and glabrous. Leaves all basal, densely white-woolly or less so above, rounded, 2–5 cm. broad, usually cordate at base, the petioles slightly longer; peduncles pedicel-like, usually 1–2 mm. long; involucre solitary, turbinate, about 2 mm. long, glabrous, 5-lobed; flowers several; calyx white turning rose, tube very short, obtuse at base; outer calyx-lobes ovate-elliptic, 2–2.5 mm. long in fruit, rounded at apex, cordate at base, glabrous without, the inner smaller, narrowly ovate, acute.

Desert washes and plains, Lower Sonoran Zone; Mojave and Colorado Deserts, California, western Nevada, Arizona, and Lower California. Type locality: Three Point Bend, Chocolate Mountains, California. May–July. Skeleton Weed.

Eriogonum deflexum subsp. *Watsonii* (Torr. & Gray) Stokes, Gen. Eriog. 44. 1936. (*E. Watsonii* Torr. & Gray, *E. barbatum* Elmer.) This subspecies differs chiefly from the typical species in the more slender and longer (4–10 mm.) peduncles. Desert slopes, mainly Upper Sonoran Zone; western Nevada to northwestern Arizona and the western edge of the Mojave Desert, California. Type locality: Humboldt Mountains, Nevada.

Eriogonum deflexum var. *brachypodium* (Torr. & Gray) Munz, Man. S. Calif. 119. 1935. (*E. brachypodium* Torr. & Gray.) Low wide spreading annual with the habit of the typical species and similar short peduncles, but the branches, peduncles, and involucre glandular instead of glabrous. This subspecies ranges from Inyo County, California, and adjacent Nevada to western Arizona and Lower California. Type locality: Kingston Spring, Kingston Mountains, San Bernardino County, California.

Eriogonum Rixfordii Stokes, Leaflets West. Bot. 1: 29. 1932. Annual, intricately and divaricately branched, with very short internodes, glabrous and glaucous. Leaves basal, rounded, tomentose; peduncles 1–2 mm. long or the involucre sessile; calyx glabrous, the outer lobes cordate at base, slightly inflated; achene 3-angled, beaked. Desert washes, Inyo County, California. Closely related to *Eriogonum deflexum* var. *brachypodium*, but taller and the branches forming a succession of stories suggesting a pagoda.

38. *Eriogonum argillòsum* J. T. Howell. Clay-loving Eriogonum. Fig. 1386.*Eriogonum argillosum* J. T. Howell, Leaflets West. Bot. 1: 13. 1932.

Annual, with the stem striate but not angled, the first internode of the main stem 3–10 cm. long, with or without a few secondary stems from the base, the branches usually 3–4 from a node simulating a compound umbel, glabrous or very sparingly tomentose. Basal leaves with oblong blades, 15–25 mm. long, narrowed to slender petiole as long or longer, densely white-tomentose beneath, less so above, obscurely revolute-margined; stem leaves at the first node similar but much reduced, short-petioled; those of the upper nodes reduced to bracts; stipules lanceolate-subulate, scarious-tomentose within; involucre turbinate, 2.5 mm. high, lobes obscure, indicated by broad green midribs, the sinuses scarious; bractlets filiform; calyx-lobes rose or white tinged with rose, with a dark midrib 1.5 mm. long, outer oblong, inner similar but slightly narrower, entire or crenulate; achene about 2 mm. long.

Clay soil, and serpentine outcrops, Upper Sonoran Zone; Santa Clara to San Benito and Monterey Counties, California. Type locality: Poncho Rico Canyon, east of San Bernardo, Monterey County, California. March–June.

39. *Eriogonum vestitum* J. T. Howell. Idria Eriogonum. Fig. 1387.*Eriogonum vestitum* J. T. Howell, Leaflets West. Bot. 2: 42. 1937.

Annual, the stem erect, 1–4 dm. high, simple below, di- or trichotomous above, densely white-tomentose, branches ascending. Basal leaves alternate, elliptic to oblong-elliptic, 1–3 cm. long, obtuse or acutish at apex, cuneate at base, tomentose on both surfaces; petioles slender, 2–3.5 cm. long; stem leaves verticillate at the first and second nodes, similar to the basal but smaller, those of the upper nodes reduced to bracts; peduncles 1–6 cm. long; involucre solitary, campanulate-turbinate, 2 mm. long, 5-lobed, the sinuses narrow, scarious; calyx white with reddish midvein, the lobes oblong-ovate, 1.5 mm. long, little enlarged in fruit, the outer surface papillose on the midrib and margin; filaments hairy at base; achene papillose on the beak.

Dry slopes, Upper Sonoran Zone; South Coast Ranges, San Benito County, California. Type locality: talus of disintegrating shale, 4 miles from Idria on road to Panoche, San Benito County. April–June.

40. *Eriogonum nidulàrium* Coville. Bird-nest Eriogonum or Whisk-broom.

Fig. 1388.

Eriogonum nidularium Coville, Contr. U.S. Nat. Herb. 4: 186. 1893.*Eriogonum vimineum* subsp. *nidularium* Stokes, Gen. Eriog. 49. 1936.*Eriogonum nidularium* var. *lucense* M. E. Jones, Contr. West. Bot. No. 11: 17. 1903.

Annual, the stems repeatedly dichotomously branched from or near the base, 5–20 cm. high, the branches numerous with short internodes, at length the outer branches often turned inward to form a dense crown suggesting a bird's nest, closely and rather densely floccose. Leaves all basal, floccose, the blades rounded, cordate at base, 1–2.5 cm. broad, on petioles 2–3 times as long; bracts subulate-triangular, 2–3 mm. long; involucre occurring at almost every node, sessile, barely over 1 mm. high; flowers solitary or usually 2–3 in an involucre, yellowish or sometimes reddish or white, 1.5 mm. long, glabrous; outer lobes broad and truncate at the apex, the sides concave, the inner lobes similar but smaller; ovary and achene scabrous above.

Rocky canyons and hillsides, Lower Sonoran Zone; Mojave Desert region, Kern and San Bernardino Counties, California, to western Nevada. Type locality: Cottonwood Canyon, Panamint Mountains, California. April–Oct.

41. *Eriogonum dasyánthemum* Torr. & Gray. Many-flowered Eriogonum.

Fig. 1389.

Eriogonum dasyanthemum Torr. & Gray, Proc. Amer. Acad. 8: 177. 1870.*Eriogonum dasyanthemum* var. *Jepsonii* Greene, Fl. Fran. 150. 1891.

Annual, branched from the base or simple to the first node, usually widely branched above, floccose-tomentose, often soon glabrate, 2–5 cm. high. Basal leaves rounded, 8–20 mm. broad, white-tomentose beneath, glabrate above; petioles about the same length; stem leaves confined to the first and second nodes, round-ovate, usually longer than their petioles; involucre 3.5–4 mm. long, usually solitary at the nodes, distinctly ribbed, 5-toothed, the sinuses open; flowers often 15–20 to each involucre; calyx white or rose, 2 mm. long, villous-pubescent without, glabrous within; outer lobes oblong-obovate, rounded at apex; filaments glabrous or sparingly pubescent at very base; achene 2 mm. long, the beak scabrous, longer than the body.

Open gravelly places, Upper Sonoran Zone; North Coast Ranges, California. Type locality: near Clear Lake, Lake County, California. June–Oct.

42. *Eriogonum élegans* Greene. Elegant Eriogonum. Fig. 1390.*Eriogonum elegans* Greene, Pittonia 2: 173. 1891.*Eriogonum vimineum* var. *elegans* Jepson, Fl. Calif. 413. 1914.

Annual, the stem erect, repeatedly dichotomously branched above, the ultimate virgate branches very slender, 2–4 dm. high, reddish, glabrous and glaucescent throughout except for the leaf-bearing base, this white-woolly. Leaves basal, densely white-woolly on both surfaces and petioles, the blades rounded or subcordate at base, undulate on the margins, 8–20 mm. broad; involucre 1 mm. long, turbinate, nerveless, 5-toothed, glabrous except the ciliolate margin; calyx rose red, 1 mm. long, glandular-puberulent without, the lobes oblong-obovate.

Sandy flats and washes, Sonoran Zones; Inner South Coast Ranges, central California. Type locality: sandy bed of the upper Salinas River, Monterey County, California. July–Sept.

43. *Eriogonum Baileyi* S. Wats. Bailey's Eriogonum. Fig. 1391.

Eriogonum Baileyi S. Wats. Proc. Amer. Acad. 10: 348. 1875.

Eriogonum vimineum subsp. *Baileyi* Stokes, Gen. Eriog. 49. 1936.

Eriogonum demissum Stokes, Gen. Eriog. 49. 1936.

Annual, the stems 1-4 dm. high, solitary and simple to the first node or sometimes several from the base, diffusely branched above, the branchlets mostly ascending, glabrous and glaucous throughout. Leaves all basal, densely white-tomentose on both surfaces, orbicular to round-ovate, 5-15 mm. broad; bracts triangular-subulate, small; involucre sessile, appressed to the branchlets, 1.5 mm. long, the erect teeth pubescent on the margins, otherwise glabrous; calyx white, more or less tinged with pink, 1.5 mm. long, minutely glandular; outer lobes ovate-oblong, the inner narrower; achene flask-shaped, the beak exceeding the somewhat compressed body.

Dry desert slopes, Upper and Lower Sonoran Zones; southeastern Washington to Nevada, Arizona, and the Mojave Desert, California. Type locality: northwestern Nevada. May-Aug.

44. *Eriogonum brachyanthum* Coville. Short-flowered Eriogonum. Fig. 1392.

Eriogonum brachyanthum Coville, Contr. U.S. Nat. Herb. 4: 185. 1893.

Eriogonum Baileyi var. *brachyanthum* Jepson, Fl. Calif. 414. 1914.

Eriogonum vimineum var. *brachyanthum* Stokes, Gen. Eriog. 50. 1936.

Annual, diffusely branched from near the base, in vigorous plants forming a broad round-topped crown, 2-3 dm. high, green and glabrous above, persistently woolly-pubescent at base. Leaves all basal, rounded or broadly ovate, rounded or subcordate at base, 8-20 mm. broad, densely white-woolly on both surfaces; petioles slender, longer than the blades; bracts minute, glabrous without; involucre 1 mm. long, closely appressed to the stem, sometimes also in the axil of the terminal bracts, glabrous; usually 4-6-flowered; calyx glabrous, pale yellow, about 0.7 mm. long, outer lobes oblong or oblong-obovate, the inner a little narrower; achene about 1 mm. long, the slender beak slightly exerted.

Dry gravelly or sandy soils, Mojave Desert, California, to western Nevada. Type locality: "a few miles north of Indian Wells, Inyo County, California." May-Aug. Yellow Buckwheat.

45. *Eriogonum virgatum* Benth. Virgate Eriogonum. Fig. 1393.

Eriogonum virgatum Benth. in DC. Prod. 14: 16. 1856.

Eriogonum roseum Dur. & Hilg. Pacif. R. Rep. 53: 14. pl. 15. 1856.

Eriogonum vimineum subsp. *virgatum* Stokes, Gen. Eriog. 53. 1836.

Annual, the stems almost always solitary, with comparatively few strictly virgate branches, 1-7 dm. high, floccose-tomentose throughout. Basal leaves oblong-oblancoate, 1-3 cm. long, the petioles of about the same length, white-tomentose on both surfaces or somewhat glabrate above; the lower nodes usually bearing one or two similar but shorter-petioled leaves; bracts of the flower-bearing branches triangular-subulate; involucre cylindric, 3 mm. long, densely white-tomentose, grooved between the broad rounded ribs, the teeth erect, acutish; flowers several to many; calyx glabrous, 2 mm. long, yellow or sometimes tinged with rose; outer lobes obovate, the inner narrower and oblong; ovary flask-shaped, scabrous above.

Gravelly slopes, Upper Sonoran and Arid Transition Zones; southern Oregon to southern California. Type locality: California, collected by Fremont. June-Oct.

46. *Eriogonum gracile* Benth. Slender Woolly Eriogonum. Fig. 1394.

Eriogonum gracile Benth. Bot. Sulph. 46. 1844.

Eriogonum acetoselloides Torr. ex Benth. in DC. Prod. 14: 16. 1857.

Eriogonum leucocladon Benth. Pl. Hartw. 333. 1857.

Eriogonum agninum Greene, Pittonia 2: 165. 1891.

Eriogonum vimineum subsp. *gracile* Stokes, Gen. Eriog. 51. 1936.

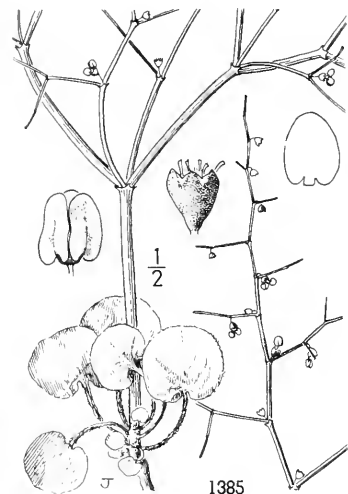
Annual, the stems floccose-tomentose throughout, more or less diffusely branched from or near the base, 2-5 dm. high, the branchlets ascending, slender, giving a broom-like effect. Leaves floccose-tomentose on both sides, the basal with slender petioles as long or longer than the oblanceolate or broadly oblong blades, solitary or few on the lower nodes and short-petioled or subsessile; bracts of the lower nodes often foliaceous, those of the upper branchlets triangular-subulate, about equaling the involucre; involucre 1.5-2 mm. long, tomentose in the sinuses, otherwise glabrous, the teeth rigid, 1.5 mm. long, acute; flowers few, white or pale rose; calyx glabrous without, the outer lobes broadly rounded at the apex, abruptly narrowed below, the inner oblong-obovate.

Sandy soil of the valleys and foothills, Sonoran Zones; Sacramento Valley and Inner Coast Ranges, California, to northern Lower California. A variable species, some forms have none of the bracts foliaceous. Type locality: San Pedro, California. July-Oct.

47. *Eriogonum citharaeforme* S. Wats. Cithara Eriogonum. Fig. 1395.

Eriogonum citharaeforme S. Wats. Proc. Amer. Acad. 23: 266. 1888.

Annual, the stems branched from the base, procumbent or ascending, 2-3-plurichotomous, 2-3 dm. long, glabrous. Leaves all basal, or usually one or two at the first node, the blades rounded to oblong-lanceolate, 1-2 cm. long, abruptly or more gradually narrowed to the winged petiole, the blade and wing of the petiole crisped on the margins; bracts scarious, triangular-subulate,



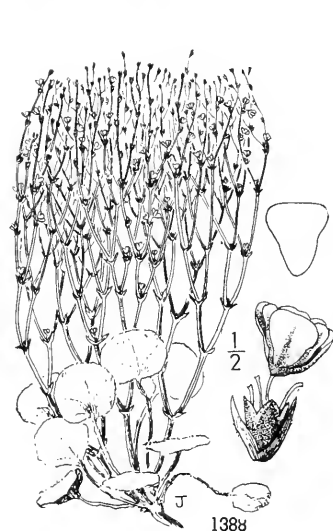
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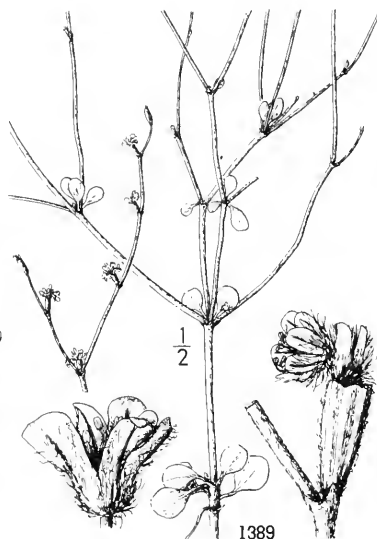
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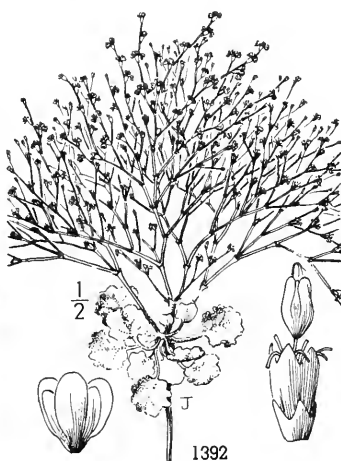
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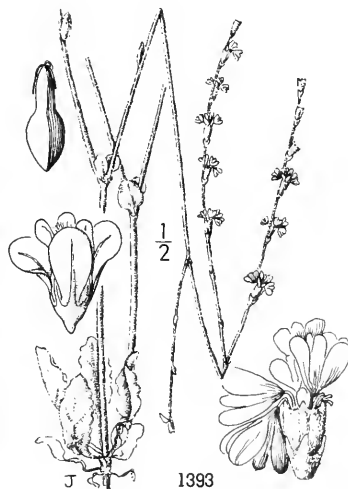
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1385. *Eriogonum deflexum*
 1386. *Eriogonum argillosum*
 1387. *Eriogonum vestitum*

1388. *Eriogonum nidularium*
 1389. *Eriogonum dasyanthemum*
 1390. *Eriogonum elegans*

1391. *Eriogonum Baileyi*
 1392. *Eriogonum brachyanthum*
 1393. *Eriogonum virgatum*

2 mm. long, glabrous or somewhat villous-pubescent on the margins; involucre sessile and mostly solitary at the nodes, narrowly turbinate, 2.5–3 mm. long, glabrous, the tissue between the slender ribs mostly scarious, the teeth evident, acute, slightly spreading; flowers several in the involucre; calyx white, more or less tinged with rose, glabrous without, the outer lobes oblong-obovate; filaments obscurely short-pubescent at base; ovary scabrous above.

Sandy or gravelly soils, Upper Sonoran Zone; Coast Ranges, San Luis Obispo and Santa Barbara Counties, California. Type locality: Baron Schroeder's Ranch, 30 miles north of San Luis Obispo, California. May–Sept.

48. *Eriogonum moléstum* S. Wats. Pine Eriogonum. Fig. 1396.

Eriogonum molestum S. Wats. Proc. Amer. Acad. 17: 379. 1882.

Eriogonum vimineum subsp. *molestum* Stokes, Gen. Eriog. 50. 1936.

Annual, the stem usually solitary, branches comparatively few, ascending, 3–8 dm. high, glabrous and pale glaucous green. Leaves all basal, reniform or rounded, 1–2 cm. broad, densely white-tomentose, usually somewhat less so above, crisped or undulate on the margins, petioles exceeding the blades; bracts glabrous, rather distant; involucre closely appressed to the stem, 4–5 mm. long, glabrous, scarious between the ribs; flowers several; calyx white or tinged with rose, 1.5 mm. long, glabrous; outer lobes oblong-obovate, the inner narrower; achene scarcely exerted, scabrous above.

Open pine forests, Arid Transition Zone; mountains of southern California, San Bernardino, San Jacinto, and Cuymaca Ranges. Type locality: mountains of southern California. June–Aug.

Eriogonum molestum var. *Davidsonii* (Greene) Jepson, Fl. Calif. 412. 1914. (*Eriogonum Davidsonii* Greene, Pittonia 2: 295. 1892.) Similar to the typical species in habit but more slender and floral parts smaller; involucre 3 mm. long. Mountains of southern California, mainly in the San Gabriel Mountains.

49. *Eriogonum vimíneum* Dougl. Wicker Eriogonum. Fig. 1397.

Eriogonum vimineum Dougl. ex Benth. Trans. Linn. Soc. 17: 416. 1837.

Annual, with one to several stems from the base, usually becoming well-branched forming a flat-topped or rounded crown, 1–6 dm. high, the lower internodes more or less loosely floccose, upper branches glabrous and green or reddish brown. Leaves all basal or very rarely one or two at the first node, orbicular-obovate, 15–20 mm. long, abruptly contracted to gradually narrowed to the petioles, glabrate above; ultimate branchlets elongated, slender; bracts triangular-lanceolate, usually about 1 mm. long; involucre narrowly cylindric, 2 mm. long, the teeth short, obtuse or rounded; flowers several; calyx rose-colored or yellowish, 2 mm. long, glabrous or rarely sparsely and inconspicuously glandular toward the base; outer lobes nearly obovate, the inner a little narrower; filaments glabrous; achene flask-shaped, the beak longer than the body and scabrous.

Dry hillsides and plains, especially in sandy soil, Upper Sonoran and Transition Zones; eastern Washington and Rogue River, Oregon, western Nevada, and California to the North Coast Ranges, and central Sierra Nevada. Type locality: along the Columbia River, eastern Washington. June–Sept.

Eriogonum vimineum var. *caninum* Greene, Fl. Fran. 150. 1891. Stems coriaceous, glabrous or somewhat woolly toward the base, reddish, the ultimate branchlets slender; flowers bright, glabrous. This variety replaces the typical form in central California extending from the coast to the Great Valley. Type locality: on dry hills, Tiburon, California.

Eriogonum pedunculátum Stokes, Leaflets West. Bot. 2: 48. 1937. Slender annual of the general aspect of *E. vimineum*; involucre pedunculate, the peduncles very slender, erect, almost appressed against the branches of the inflorescence, 1–10 mm. long. Known only from the original collection made on Mokelumne Hill, Calaveras County, California.

50. *Eriogonum mohavénse* S. Wats. Mojave Eriogonum. Fig. 1398.

Eriogonum mohavense S. Wats. Proc. Amer. Acad. 12: 266. 1877.

Eriogonum delicatulum S. Wats. Proc. Amer. Acad. 17: 379. 1882.

Annual, the stems solitary to several from the base, glabrous and glaucous, repeatedly trichotomously or dichotomously branched, 1–3 dm. high, forming a wide open crown, the ultimate branchlets subcapillary. Leaves all basal, white-floccose, rounded to oblong-obovate, 1–2 cm. long on slender petioles about twice as long; bracts triangular; involucre sessile in the forks, and often terminal on the ultimate branchlets, barely 2 mm. long, glabrous except in the throat; flowers usually several; calyx yellow, about 1 mm. long, glabrous, outer lobes mostly elliptic, the inner a little smaller and narrower; achene glabrous, 1.5 mm. long, more or less exerted.

Dry desert slopes and washes, Lower Sonoran Zone; western Mojave Desert and Owens Valley, California. Type locality: "Mohave Valley," Mojave Desert, California. June–Aug.

Eriogonum ampulláceum J. T. Howell, Leaflets West. Bot. 1: 179. 1935. (*E. mohavense* subsp. *ampullaceum* Stokes, Gen. Eriog. 33. 1936.) Annual, the stems erect, 1–2 dm. high, glabrous, di- or trichotomously branched, the branches ascending. Leaves basal, orbicular, 5–10 mm. broad, white-tomentose beneath, floccose above; petioles 5–15 mm. long; bracts triangular, about 1 mm. long; involucre solitary and sessile or subsessile in the axils of the bracts, borne in the upper forks and at the end of the branchlets, turbinate-campanulate, 1.5–2 mm. long, microscopically granular, 5-lobed, the lobes rounded; flowers several; calyx ochroleucous, 1.25 mm. long, the lobes suborbicular, shorter than the tube, entire; achene flask-shaped, 1 mm. long, the beak muriculate-papillose. Dry desert slopes, Upper Sonoran Zone; Long Valley, Mono County, California.

Eriogonum Hoffmannii Stokes, Leaflets West. Bot. 1: 23. 1932. Annual, the stems erect, rather stout, 2–4 dm. high, glabrous, di- and trichotomously branched above, occasionally with a few short branches from the base. Leaves basal, suborbicular, subcordate, 2–3 cm. broad, glabrate above, white-tomentose beneath; floral bracts minute, closely subtending the sessile involucre, these borne at the forks and the ends of short pedicel-like branchlets, turbinate-campanulate, 1.5 mm. long; flowers few in each involucre; calyx rose-colored, glabrous, lobed to near the base, the lobes ovate-lanceolate, not cordate at base; achene slightly exerted. Known only from the vicinity of the type locality, Wild Rose Canyon, Panamint Mountains, Inyo County, California.

51. *Eriogonum truncatum* Torr. & Gray. Contra Costa *Eriogonum*. Fig. 1399.*Eriogonum truncatum* Torr. & Gray, Proc. Amer. Acad. 8: 173. 1870.

Annual, the stems solitary or several from the base, 1-3 dm. high, the first and sometimes the second internodes elongated, erect, the upper ones more spreading forming an open umbel-like cyme, loosely floccose becoming unevenly glabrate. Leaves basal and on the lower nodes, white-floccose below, thinly so and green above, oblong-lanceolate to obovate, 2-4 cm. long, tapering to the petiole, the margins undulate; involucre sessile, solitary or 2-4 together at the nodes, the uppermost terminal but in the axils of bracts, 3 mm. long, tomentose, narrowly obconic, very shallowly and broadly 5-toothed, the sinuses between filled by a papery membrane; calyx glabrous, pale rose, about 2 mm. long; outer lobes elliptic-obovate, the inner similar, but a little narrower; filaments pubescent below; achene minutely scabrous except toward the base.

Dry hillsides, Upper Sonoran Zone; a species of restricted distribution in the interior of Contra Costa County, California. Type locality: east base of Mount Diablo, Contra Costa County, California. April-June.

52. *Eriogonum Covilleanum* Eastw. Coville's *Eriogonum*. Fig. 1400.*Eriogonum Covilleanum* Eastw. Proc. Calif. Acad. 20: 138. 1931.*Eriogonum vimineum* var. *Covilleanum* Stokes, Gen. Eriog. 53. 1936.

Annual, the stem simple below or branching from the base, 1-3 dm. high, glabrous, repeatedly branched above, with slender glabrous branchlets. Leaves all basal, suborbicular, rounded at apex, subcordate or truncate and then short-cuneate at base, white-tomentose beneath, glabrous and often reddish above; involucre solitary, sessile in the forks and at the nodes of the very slender branchlets, 5-veined, glabrous without, the margin entire and sparsely ciliate; calyx 2 mm. long, rose or white and rose-veined, the lobes elliptic, puberulent on midveins at base.

Dry hills, Upper Sonoran Zone; Inner Coast Ranges, Alameda County to San Benito County, California. Type locality: "On bluffs along the road from Mt. Hamilton to Livermore," California. April-June.

Eriogonum Covilleanum subsp. *adsurgens* (Jepson) Abrams. (*E. truncatum* var. *adsurgens* Jepson, Fl. Calif. 414. 1914. *E. vimineum* subsp. *adsurgens* Stokes, Gen. Eriog. 52. 1936. *E. Eastwoodianum* J. T. Howell, Leaflets West. Bot. 2: 134. 1938.) Plants very similar to the typical species, but all parts a little larger; involucre toothed, the membranous connection not extending to the apex of the midribs. This subspecies inhabits the Inner Coast Ranges from San Benito County to San Luis Obispo County, California.

53. *Eriogonum Nortonii* Greene. Norton's *Eriogonum*. Fig. 1401.*Eriogonum Nortonii* Greene, Pittonia 2: 165. 1891.*Eriogonum vimineum* subsp. *Nortonii* Stokes, Gen. Eriog. 52. 1936.

Annual, di- or trichotomously branching, 5-20 cm. high, the stems glabrous, reddish in age. Leaves whorled at the base and usually on the lower nodes, orbicular or reniform, cordate at base, deeply emarginate at apex, 5-15 mm. broad, densely white-tomentose beneath, glabrous above, the petiole very slender; involucre sessile in the forks and terminal on the short branchlets, solitary, broadly turbinate, 3 mm. long, glabrous without, the teeth usually 8, short and blunt; flowers many, white or rose-colored, 1.5 mm. long calyx-lobes similar, obovate, rounded at apex, glabrous.

Dry rocky ridges, Upper Sonoran Zone; Inner Coast Ranges of Monterey and San Benito Counties, California. Type locality: Palisades and Cholone Peaks near Gonzales, Monterey County, California. May-Aug.

54. *Eriogonum deserticola* S. Wats. Desert *Eriogonum*. Fig. 1402.*Eriogonum deserticola* S. Wats. Proc. Amer. Acad. 26: 125. 1891.

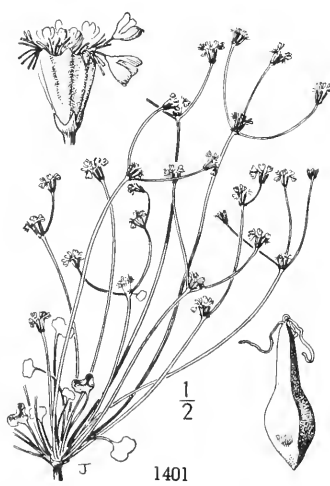
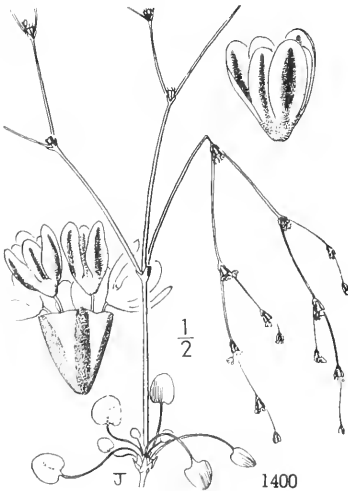
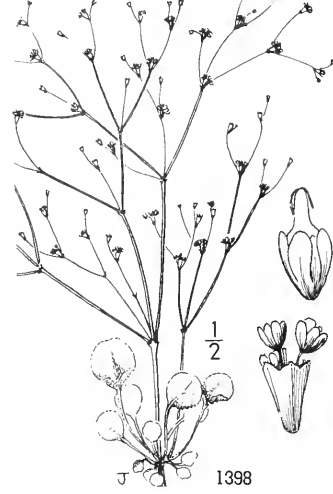
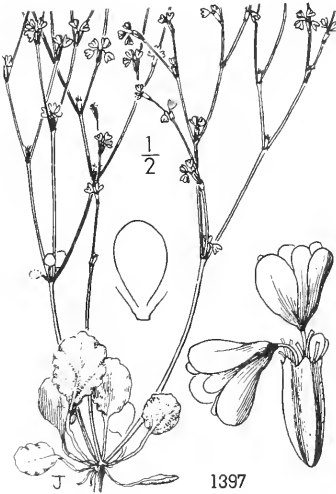
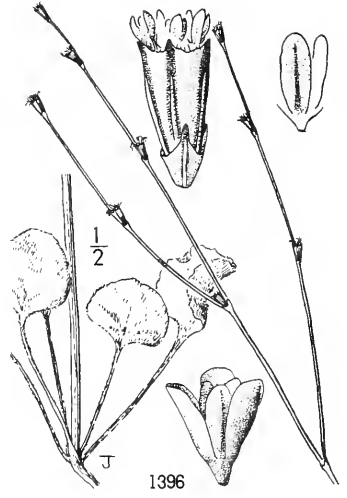
Diffusely branched shrub, 10-15 dm. high, the young branchlets hoary-tomentose, soon glabrous and light green. Leaves scattered along the young branchlets, broadly or round-ovate, 4-8 mm. long, hoary-tomentose on both surfaces, the margins undulate, petioles about as long, early deciduous leaving the plants leafless and glabrous at flowering time; involucre solitary at the nodes in the axils of the short bracts, subsessile or short-pedicelled, turbinate-campanulate, scarcely 2 mm. long, tomentose, the teeth low and rounded, 1-3-flowered; calyx 2 mm. long, lobed almost to the base, villous without, the lobes narrowly elliptic, yellow, with green or reddish midveins.

Dry sandy washes, Lower Sonoran Zone; Colorado Desert, California, in the western part, also on the eastern border in the sandunes west of Yuma. Type locality: southwestern part of Colorado Desert, California. Sept.-Dec. Desert Buckwheat.

55. *Eriogonum crocatum* Davidson. Saffron *Eriogonum*. Fig. 1403.*Eriogonum crocatum* Davidson, Bull. S. Calif. Acad. 23: 17. pl. e. 1924.*Eriogonum saxatile* var. *crocatum* Munz, Man. S. Calif. 120. 1935.

Perennial with a loosely branched woody caudex, clothed with withered leaves or old leaf bases, 1-3 dm. high, densely white-woolly. Leaves scattered, with broad winged petioles often recurved at base, broadly ovate, 15-25 mm. broad, obtuse or acutish at apex, abruptly narrowed at base, densely white-woolly on both surfaces; inflorescence a rather dense cyme terminating a stout terminal scape-like peduncle 5-10 cm. long, once or twice branched at right angles; involucre terminating the branches of the cyme and in the forks, broadly campanulate, 3-4 mm. long, obscurely 7-8-toothed, densely white-woolly; flowers many, yellow, becoming 5-6 mm. long, glabrous, with an elongated stipe-like base; calyx-lobes similar, oblong-lanceolate; filaments hairy at base; achene glabrous; styles elongate.

Rocky slopes, Upper Sonoran Zone; coastal ranges, Ventura County, California. Type locality: rocky grounds west of Conejo Grade, Ventura County, California. April-June. This and the next species show a close relationship with *Eueriogonum*.



1394. *Eriogonum gracile*
1395. *Eriogonum citharaeforme*
1396. *Eriogonum molestum*

1397. *Eriogonum vimineum*
1398. *Eriogonum mohavense*
1399. *Eriogonum truncatum*

1400. *Eriogonum Covilleum*
1401. *Eriogonum Nortonii*
1402. *Eriogonum deserticola*

56. *Eriogonum saxatile* S. Wats. Rock Eriogonum. Fig. 1404.

Eriogonum saxatile S. Wats. Proc. Amer. Acad. 12: 267. 1877.

Eriogonum Bloomeri Parish, Erythea 6: 87. 1898.

Eriogonum Stokesiae M. E. Jones, Contr. West. Bot. No. 8: 39. 1898.

Perennial with a low few-branched woody caudex, clothed above by the crowded leaves, flowering stems one to several, 6–45 cm. high, branched above, the branches ascending or sometimes spreading. Leaves all basal, densely clothed with close white felt, rounded or often broader than long with a rounded summit, often apiculate at apex, abruptly cuneate at base, varying to obovate, 5–25 mm. long, petioles as long or longer; involucre solitary at the nodes, the lateral ones appressed, tomentose, 3–4 mm. long, turbinate, many-flowered; calyx white or yellowish, tinged with rose or sometimes deep rose, 6–7 mm. long, narrowed to a triangular base, glabrous, outer lobes oblanceolate, the inner obovate and longer.

Dry rocky slopes and ridges, usually in disintegrated granite, mainly Arid Transition Zone; Santa Cruz Mountains, southern Sierra Nevada, and Panamint Mountains to the San Jacinto Mountains, California. Type locality: San Bernardino and Santa Lucia Mountains, California. May–Aug.

57. *Eriogonum niveum* Dougl. Snow Eriogonum or Canyon Heather. Fig. 1405.

Eriogonum niveum Dougl. ex Benth. Trans. Linn. Soc. 17: 414. 1837.

Eriogonum dichotomum Dougl. ex Benth. Trans. Linn. Soc. 17: 415. 1837.

Caudex low and few-branched or loosely caespitose. Leaves erect, densely white-tomentose on both faces, petioles 2–3 times as long as the blades, these oblong or oblong-elliptic to elliptic-ovate, 15–40 mm. long; flowering stems floccose-tomentose, 15–45 cm. high, the lower nodes of the inflorescence often bearing foliaceous bracts; involucre solitary and racemously scattered along the erect branches of the inflorescence, 5–6 mm. long, shallowly and broadly toothed, densely white-tomentose; calyx white or yellowish, 2–2.5 mm. long, glabrous, the outer lobes broadly elliptic, rounded at base or slightly subcordate, the inner spatulate.

Dry open ground, Upper Sonoran Zone; northeastern Washington to eastern Oregon and Idaho. Type locality: "Valleys of the Blue Mountains." June–Sept.

Eriogonum niveum subsp. *decumbens* (Benth.) Stokes, Gen. Eriog. 62. 1936. Lower, more compactly caespitose caudex, forming broad mats; leaves broader than in the typical species, mostly ovate or oval-ovate. Sand hills, southern Washington (Clickitat County) to northern part of eastern Oregon.

58. *Eriogonum Wrightii* subsp. *trachygònum* (Torr.) Stokes. Wright's Eriogonum. Fig. 1406.

Eriogonum trachygònum Torr. ex Benth. in DC. Prod. 14: 15. 1857.

Eriogonum Wrightii var. *trachygònum* Jepson, Fl. W. Mid. Calif. 154. 1901.

Eriogonum Wrightii subsp. *trachygònum* Stokes, Leaflets West. Bot. 2: 47. 1937.

Cespitose perennial with low branched woody caudex, the branches erect, 10–25 cm. high. Leaves usually crowded, densely white-tomentose on both surfaces, 8–25 mm. long, the smaller ones fascicled in the axils, broadly to rather narrowly oblanceolate, acute at apex, narrowed at base to a short petiole, this slightly expanded at base but not forming a membranous sheath around the stem; flowering stems 15–25 cm. high, white-tomentose, once or twice dichotomous, the angle of branching narrow; involucre mostly solitary at the nodes, crowded toward the apex by the shorter internodes, 2–2.5 mm. long, exceeding the short bracts, tomentose or sometimes glabrate, distinctly toothed; flowers several; calyx 2 mm. long, white with green or rose-colored veins, glabrous, the outer lobes broadly obovate, the inner a little narrower.

Sandy or gravelly soils or rocky ridges, Upper Sonoran and Arid Transition Zones; foothills of Upper Sacramento River south through Inner Coast Ranges and Sierra Nevada to Elizabeth Lake, Los Angeles County, California, east to Nevada and northern Arizona, where this subspecies intergrades with typical *E. Wrightii* Torr. of the southern Rocky Mountains. Type locality: "Valley of the Upper Sacramento," California. Aug.–Oct.

Eriogonum Wrightii subsp. *subscapòsum* (S. Wats.) Stokes, Leaflets West. Bot. 2: 47. 1937. (*E. Wrightii* var. *subscapòsum* S. Wats. Bot. Calif. 2: 29. 1880. *E. junceum* Greene, Leaflets Bot. Obs. 1: 77. 1904. *E. curvatum* Small, Bull. Torrey Club 25: 50. 1898.) Woody branches of the caudex very short forming a dense leafy mat; flowering stems slender, 1–3 dm. high, sparingly branched. Leaves densely crowded, 4–12 mm. long, densely white-tomentose. Gravelly or rocky ridges, Canadian and upper part of Arid Transition Zones; Sierra Nevada to the San Jacinto Mountains, California.

Eriogonum Wrightii subsp. *membranaceum* Stokes, Leaflets West. Bot. 2: 47. 1937. (*E. Wrightii* var. *membranaceum* Stokes ex Jepson, Fl. Calif. 416. 1914.) Woody caudex usually much branched, 2–3 dm. high, clothed by the persistent membranous brownish sheath bases of the petioles. Leaves narrowly oblanceolate, strongly revolute, 4–12 mm. long, densely white-tomentose beneath, thinly tomentose above and greenish. This subspecies inhabits mainly desert slopes, from the San Bernardino Mountains, California, to the Sierra San Pedro Martir, Lower California.

Eriogonum panamintense Morton, Journ. Wash. Acad. 25: 308. 1935. Perennial, erect and strict, 2–3 dm. high, much branched at base, but not densely caespitose, floccose-tomentose. Leaves of the basal branches scattered, long-petioled, elliptic to obovate, 16–25 mm. long, densely white-tomentose, those of the flowering stems verticillate at the nodes, rounded, short-petioled; involucre 3–5 mm. long; calyx 5 mm. long, the lobes oblanceolate. Panamint Mountains, Death Valley region, Inyo County, California. Type locality: Wild Rose Summit. A local and little known species related to the widespread and variable *Eriogonum Wrightii* Torr.

59. *Eriogonum strictum* Benth. Blue Mountains Eriogonum. Fig. 1407.

Eriogonum strictum Benth. Trans. Linn. Soc. 17: 414. 1837.

Eriogonum Cusickii Gandoger, Bull. Soc. Bot. Belg. 42: 193. 1906.

Eriogonum strictum var. *Cusickii* Stokes, Gen. Eriog. 66. 1936.

Woody caudex caespitose. Leaves basal, erect, with long slender petioles, the blades narrowly ovate to round-ovate, 10–25 mm. long, obtuse or rounded at apex, rounded to cuneate at base, plane, densely white-tomentose beneath, thinly so and green above; flowering stems 2–4 dm. high, slender, glabrous or slightly floccose, leafless; inflorescence cymosely few-branched, the angle of forking

45°–60°; bracts of the lowermost node linear, 4–5 cm. long, the upper triangular-subulate; involucre solitary or sometimes 2 at a node, axillary and terminal, 3–4 mm. long, narrowly turbinate, deeply 5-toothed, villous-ciliate on the margins of the teeth especially in the sinuses, otherwise glabrous, or rarely sparsely villous; calyx cream white or rose-tinged, glabrous without, 2.5–3 mm. long; the lobes all similar, oval; filaments villous at base.

Dry slopes and cliffs, mainly Arid Transition Zone; Blue Mountains of Washington and Oregon. Type locality: Blue Mountains. June–Aug.

60. *Eriogonum racemòsum* Nutt. Racemose Eriogonum. Fig. 1408.

Eriogonum racemosum Nutt. Journ. Acad. Phila. II. 1: 161. 1848.

Perennial with a woody root and simple or short-branched crown. Basal leaves ovate to oblong-ovate, rounded to acutish at base, mostly obtuse at apex, 2–4 cm. long, densely white-tomentose beneath, less so above, exceeded by the petioles; flowering stems herbaceous, leafless or the lower nodes with a few short-petioled oblong to rounded leaves, dichotomously branched above, the angle of branching about 45° and the branches elongated; flowering nodes often approximate and the flowers then simulating a raceme; involucre cylindric, 2.5–3 mm. long; calyx white or tinged with rose, 3 mm. long, glabrous, the lobes oval, becoming oblong-ob lanceolate in age; filaments pilose below; achenes retrorsely scabrous.

Dry gravelly or rocky desert slopes, Upper Sonoran Zone; Panamint, Providence and New York Mountains, California, east to Colorado and western Texas. Type locality: Colorado of the West. July–Sept.

61. *Eriogonum elongàtum* Benth. Long-stemmed Eriogonum. Fig. 1409.

Eriogonum elongatum Benth. Bot. Sulph. 45. 1844.

Perennial with a branched woody base, 10–20 cm. high, the flowering stems usually several, leafy below, branched above, 4–10 dm. high, their branches few, strict, white-tomentose throughout. Leaves ovate to lanceolate, 2–3 cm. long; petioles 5–10 mm. long or the lower longer, glabrate above, densely white-tomentose beneath; involucre distant, oblong-cylindric, 5–7 mm. long, tomentose, obscurely 5-toothed; calyx white or sometimes tinged with rose, glabrous without, 3 mm. high, the lobes obovate, obtuse, sparsely hairy on the midvein within; filaments glabrous.

Rocky hills and canyon slopes, Upper Sonoran Zone; Coast Ranges from San Benito and Monterey Counties, California, to northern Lower California. Type locality: San Pedro, California. Aug.–Nov.

62. *Eriogonum nodòsum* Small. Knotty Eriogonum. Fig. 1410.

Eriogonum nodosum Small, Bull. Torrey Club 25: 49. 1898.

Low shrub, 5–10 dm. high, rather profusely di- and trichotomously branched, the ultimate branchlets slender, hoary throughout with a dense close tomentum, or the older stems somewhat floccose. Leaves lanceolate-elliptic, acute, 4–15 mm. long, narrowed to a short petiole; involucre racemously scattered on short divaricate branchlets, turbinate-cylindric, 2–3 mm. long, tomentose; calyx white or rose-colored, 2–3 mm. long, glabrous, outer lobes oblong-obovate, the inner narrower; filaments pilose below the middle; achene minutely scabrous above.

Dry desert slopes, Lower Sonoran Zone; western borders of the Colorado Desert, southern California. Type locality: Dos Cabezas, California. Aug.–Dec.

63. *Eriogonum microthècum* Nutt. Great Basin Buckwheat Brush. Fig. 1411.

Eriogonum microthecum Nutt. Journ. Acad. Phila. II. 1: 162. 1848.

Eriogonum confertiflorum Benth. in DC. Prod. 14: 17. 1856.

Low half shrub, 1–3 dm. high, diffusely branched from the base, the bark on the woody branches shredded, the younger leaf-bearing branches tomentose. Leaves oblong-ob lanceolate to elliptic, 7–18 mm. long, short-petioled, often revolute, white-tomentose beneath, glabrate above; peduncles 3–10 cm. long, bearing a compound cymose umbel, 2–5 cm. broad; involucre narrowly turbinate, 3 mm. long, those in the axils pedicelled, the others sessile or subsessile; calyx white or yellow, sometimes tinged with rose, 2–3 mm. long, glabrous; the lobes about as long as the tube, the outer rounded, subcordate at base, the inner elliptic.

Dry sandy or rocky soils, Upper Sonoran and Arid Transition Zones; eastern Washington south, east of the Cascade-Sierra Divide, to southern California, east to Colorado and New Mexico. Type locality: "On the sides of hills, in Oregon, east of Walla Walla." June–Oct.

64. *Eriogonum Plumatèlla* Dur. & Hilg. Plumatella or Flat-top Eriogonum. Fig. 1412.

Eriogonum Plumatella Dur. & Hilg. Pacif. R. Rep. 5: 14. pl. 16. 1855.

Eriogonum Palmeri S. Wats. Proc. Amer. Acad. 12: 267. 1879.

Stems usually several, somewhat woody at base, arising from a stout woody root, 3–6 dm. high, white-tomentose throughout, intricately and strongly divaricate-branched above. Leaves confined to lower part, oblong-lanceolate to oblanceolate, 7–15 mm. long, hoary-tomentose, acute, narrowed at base to a short petiole; involucre solitary, on the approximate nodes, glabrous, 2–5 mm. long; calyx white, 2 mm. long, glabrous, the outer lobes obovate, the inner narrower; filaments pilose below the middle; achenes scabrous.

Rocky ridges, Upper Sonoran Zone; mainly piñon-juniper belt of the Mojave Desert, Walker Pass and desert slopes of the Tehachapi Mountains south to Little San Bernardino Mountains, California, east to adjacent Arizona. Type locality: "Posé Creek," Kern County, California. Aug.–Nov.

Eriogonum Plumatella var. *Jaegeri* (Munz & Johnston) Stokes ex Munz, Man. S. Calif. 120. 1935. (*E. nodosum* var. *Jaegeri* Munz & Johnston, Bull. Torrey Club 40: 350. 1922.) Differs from the typical species in that the flowering branches are glabrous instead of tomentose. Little San Bernardino Mountains, southern California. Type locality: Morongo wash, Riverside County, California.

65. *Eriogonum Heermánnii* Dur. & Hilg. Heermann's Eriogonum. Fig. 1413.

Eriogonum Heermánnii Dur. & Hilg. Pacif. R. Rep. 5: 14. 1855.

Eriogonum Heermánnii subsp. *occidentale* Stokes, Gen. Eriog. 90. 1936.

Eriogonum Howellii Stokes, Gen. Eriog. 91. 1936.

Distinctly woody below, 3–10 dm. high, the lower leaf-bearing part of the branches floccose, the upper part glabrous and pale green. Leaves oblong-lanceolate to oblanceolate, 10–15 mm. long, white-woolly beneath, green above, short-petioled; flowering branches dichotomously branched into a cymose panicle, the branchlets spreading and rigid; involucre solitary in the forks or terminal, broadly turbinate, 2 mm. long, glabrous, lobed to near the middle, the lobes rounded; flowers many in the involucre; calyx yellowish, 3–4 mm. long, glabrous, outer lobes rounded, the inner narrow.

Dry ridges, Arid Transition and Upper Sonoran Zones; South Coast Ranges, San Benito County, to Mount Pinos, Ventura County, east to the southern Sierra Nevada, California, and western Nevada from Humboldt County to Esmeralda County. Type locality: "Posé Creek," Kern County, California. July–Sept.

Eriogonum Heermánnii var. *floccosum* Munz, Man. S. Calif. 121, 597. 1935. Differs essentially only in having the branches of the inflorescence floccose-tomentose instead of glabrous. Little San Bernardino and Providence Mountains, California. Type locality: Clark Mountain, California.

Eriogonum sulcatum var. *argense* M. E. Jones, Contr. West. Bot. No. 11: 15. 1903. Diffusely and intricately branched, 1–2 dm. high, floccose-tomentose, the internodes not grooved as in typical *E. sulcatum*. Leaves 1 cm. long, narrowly oblanceolate, revolute, glabrate above, tomentose beneath; inflorescence intricately and compactly trichotomously-branched, minutely scabrous; involucre 1 mm. long, glabrous. Not convincingly distinct from dwarf forms of *E. Heermánnii*. Argus Mountains, Inyo County, California.

66. *Eriogonum ovalifolium* Nutt. Oval-leaved Eriogonum. Fig. 1414.

Eriogonum ovalifolium Nutt. Journ. Acad. Phila. 7: 50. 1834.

Encycla ovalifolia Nutt. Journ. Acad. Phila. II. 1: 166. 1848.

Densely caespitose perennial, with a short and closely branched caudex. Leaves crowded, orbicular to obovate, densely white-tomentose, 4–12 mm. long, abruptly narrowed to a usually short petiole; flowering stem scapose, 2–10 cm. high, slender, tomentose; involucre several, crowded into a congested head, campanulate, woolly-tomentose; bracts several, closely subtending the head; calyx yellowish with green or pink veins, 3–4 mm. long, glabrous; outer lobes elliptic, subcordate at base, the inner broadly spatulate; filaments hairy at base.

Rocky alpine slopes and ridges, Boreal Zones; British Columbia to California, east to the Rocky Mountains and Great Basin. In the Pacific States the typical species is mainly east of the Cascade-Sierra Divide. Type locality: "Headwaters of the Missouri River." July–Sept.

Eriogonum ovalifolium subsp. *flavissimum* (Gandoger) Stokes, Gen. Eriog. 68. 1936. (*E. flavissimum* Gandoger, Bull. Soc. Bot. Belg. 42: 193. 1906.) Flowers yellow as in the typical species, but inflorescences sparingly branched. Eastern Oregon. Type locality: Silver Creek, Harney County, Oregon.

Eriogonum ovalifolium subsp. *vineum* (Small) Stokes, Gen. Eriog. 68. 1936. (*E. vineum* Small, Bull. Torrey Club 25: 45. 1898. *E. rubidum* Gandoger, *E. roseiflorum* Gandoger, op. cit.) This species is the more common representative of the species in the Pacific region extending from the Cascades of British Columbia and the Olympic Mountains, Washington, to the southern Sierra Nevada, California. Flowers white tinged with rose, often deep rose or wine red in age; basal leaves less compact than the type. *Eriogonum nivale* Canby is a small-flowered alpine form.

67. *Eriogonum proliferum* Torr. & Gray. Proliferous Eriogonum. Fig. 1415.

Eriogonum oblongifolium var. *minus* Benth. in DC. Prod. 14: 10. 1856.

Eriogonum proliferum Torr. & Gray, Proc. Amer. Acad. 8: 164. 1870.

Eriogonum ovalifolium var. *proliferum* S. Wats. Proc. Amer. Acad. 12: 263. 1877.

Eriogonum strictum subsp. *proliferum* Stokes, Gen. Eriog. 67. 1936.

Caudex caespitose from a low mat, densely leafy, the younger white-lanate. Leaves white-lanate throughout, the petioles slender, much longer than the blades, these round-ovate to elliptic-ovate, 8–20 mm. long, plane; flowering stem rather stout, 15–25 cm. high, floccose, leafless; bracts small, linear to triangular-subulate; inflorescence cymose-umbellate, all the rays widely spreading, the primary 2–6, the secondary in pairs; involucre few, forming small heads in the primary and secondary forks as well as terminal, 5 mm. high, oblong-turbinate, 5-toothed, tomentose; flowers yellow or cream-white, 3 mm. long, with lobes broadly elliptic, subcordate at base, rounded at apex, inner obovate; ovary glabrous; filaments hairy at base.

Dry rocky slopes and plains, Upper Sonoran and Arid Transition Zones; eastern Washington to north-eastern California, Idaho, and Nevada. Type locality: "Idaho Mountains." June–Aug.

68. *Eriogonum ochrocephalum* S. Wats. Ocher-flowered Eriogonum. Fig. 1416.

Eriogonum ochrocephalum S. Wats. Bot. Calif. 2: 480. 1880.

Eriogonum ochrocephalum var. *agnellum* Jepson, Fl. Calif. 422. 1914.

Eriogonum ochrocephalum subsp. *calcareum* Stokes, Gen. Eriog. 92. 1936.

Cespitose, the caudex much branched and low, the seasonal growth leafy and densely white-tomentose. Leaves densely white-tomentose on both surfaces, oblanceolate, 15–25 mm. long, plane, narrowed to a slender petiole of equal or usually greater length; flowering stems scape-like, 5–15 cm. high, tomentose, bearing a single terminal head of several involucre, minutely bracteate or bractless; involucre turbinate-campanulate, sparsely villous-tomentose, 3–4 mm. long; calyx glabrous, yellow, 2–3 mm. long, the lobes broadly obovate.

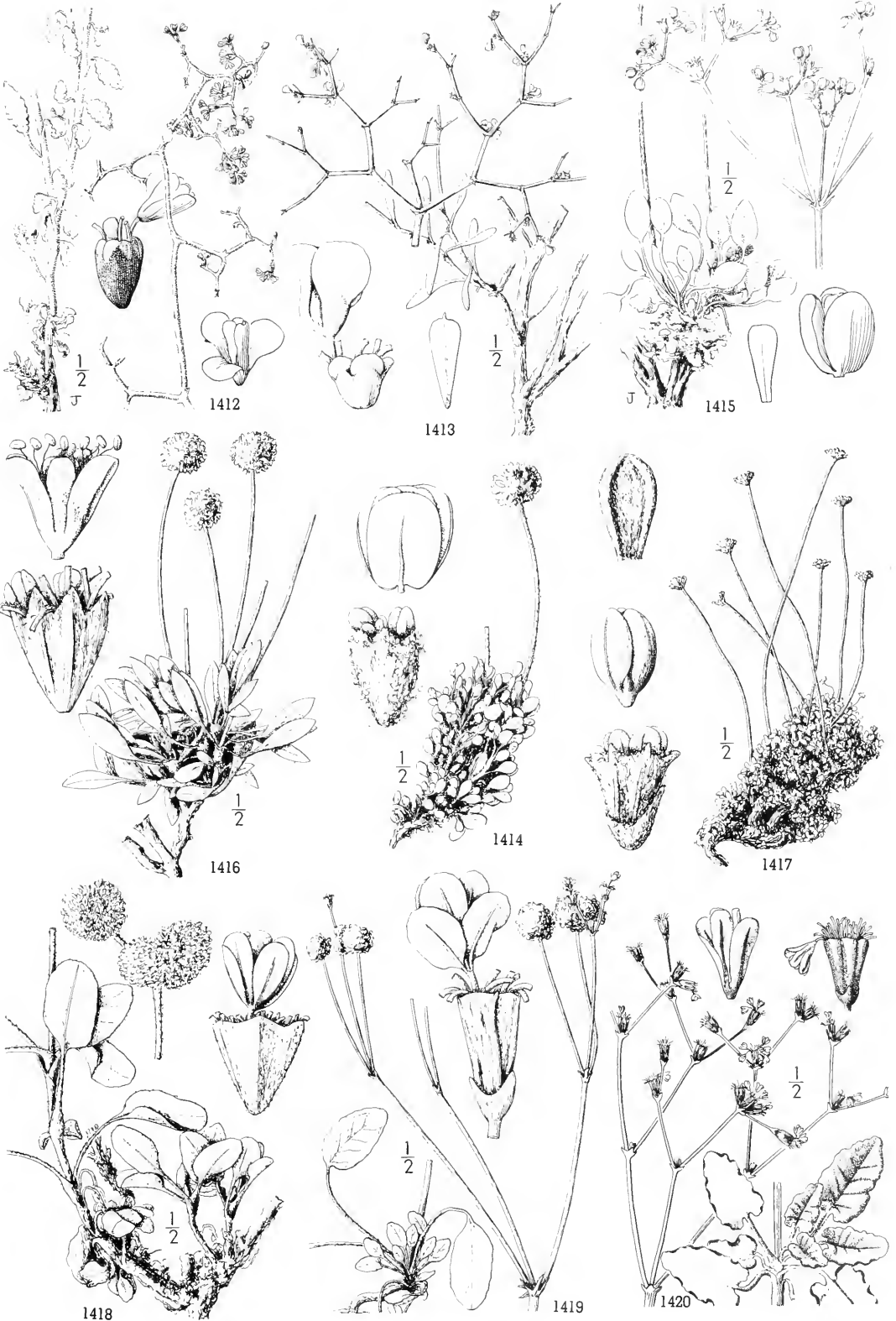
Dry loose soils, especially volcanic ash, mainly Arid Transition Zone; southeastern Oregon and adjacent Idaho to central Nevada and the eastern slopes of the northern Sierra Nevada, California. June–July.



1403. *Eriogonum crocatum*
 1404. *Eriogonum saxatile*
 1405. *Eriogonum niveum*

1406. *Eriogonum Wrightii*
 1407. *Eriogonum strictum*
 1408. *Eriogonum racemosum*

1409. *Eriogonum elongatum*
 1410. *Eriogonum nodosum*
 1411. *Eriogonum microthecum*



1412. *Eriogonum Plumatella*
 1413. *Eriogonum Heermannii*
 1414. *Eriogonum ovalifolium*

1415. *Eriogonum proliferum*
 1416. *Eriogonum ochrocephalum*
 1417. *Eriogonum Kennedyi*

1418. *Eriogonum latifolium*
 1419. *Eriogonum nudum*
 1420. *Eriogonum grande*

69. *Eriogonum Kennedyi* Porter. Kennedy's Eriogonum. Fig. 1417.

Eriogonum Kennedyi Porter ex S. Wats. Proc. Amer. Acad. 12: 263. 1877.

Eriogonum gracilipes S. Wats. Proc. Amer. Acad. 24: 85. 1889.

Eriogonum Purpusii Brandg. Bot. Gaz. 27: 457. 1899.

Cespitose, the caudex much branched forming mats. Leaves crowded, subsessile, oval to oblong-linear, 5–8 mm. long, usually strongly revolute, densely white-tomentose; flowering stems scape-like, 5–15 cm. high, slender, loosely lanate, glabrate in age, with a single head at apex or rarely with 2 or 3 short terminal rays; involucre 2 to several in the head, turbinate, 3–4 mm. long; calyx glabrous, white to pink, 3 mm. long, the lobes obovate.

Dry slopes and ridges, Arid Transition and Canadian Zones; southern Sierra Nevada to the San Jacinto Mountains, California. Several minor variations have been described, the most extreme being an alpine form with the scapes only 1–3 cm. long. June–Aug.

70. *Eriogonum latifolium* Smith. Coast Eriogonum, Tibinagua. Fig. 1418.

Eriogonum latifolium Smith in Rees, Cycl. 13: No. 3. 1809.

Leaves persistent, densely clothing the branches of the low woody caudex, ovate or ovate-oblong, rounded or cordate at base, densely white-woolly beneath, lanate or glabrate above, 2.5–4 cm. long, the margins plane or somewhat crisped; flowering stems leafless, floccose-tomentose, stout, 2–6 dm. high, simple or 2–4-forked, the forks simple or again forked; involucre congested forming a large terminal head or in the forms with forked stems the heads more reduced and occurring in the forks as well as the ends of the branches, shallowly 5-toothed, tomentose, 4 mm. long; calyx white or pale rose, glabrous, 3 mm. long, the lobes obovate, rounded at apex; filaments densely villous at base.

Bluffs and dunes along the coast, Humid Transition Zone; Cape Blanco, Oregon, to Monterey County, California. Type locality: California (Menzie). June–Dec.

71. *Eriogonum nudum* Benth. Naked-stemmed Eriogonum, Tibinagua. Fig. 1419.

Eriogonum nudum Dougl. ex Benth. Trans. Linn. Soc. 17: 413. 1837.

Eriogonum latifolium subsp. *nudum* Stokes, Gen. Eriog. 65. 1936.

Eriogonum oblongifolium Benth. Trans. Linn. Soc. 17: 412. 1837.

Eriogonum auriculatum Benth. Trans. Linn. Soc. 17: 412. 1837.

Perennial with a short simple or few-branched caudex. Leaves spreading, oblong to oblanceolate to broadly elliptic-ovate, 2–6 cm. long, rounded at apex, subcordate to cuneate at base, glabrate above, white-tomentose beneath, undulate on the margins, the petioles about twice as long; flowering stems one to several, sparsely branched above, 3–10 dm. high, glabrous; bracts of the first nodes sometimes foliaceous; involucre in axillary or terminal heads, subcylindric, 3–5 mm. long, glabrous or slightly tomentose; calyx-lobes broadly obovate, 2.5 mm. long, white with rose-colored veins, glabrous without; filaments hairy at base.

Dry ridges and slopes, Transition and Sonoran Zones; Pacific slopes from western Washington to southern California. Type locality: "Plains of the Multoonah [Willamette Valley]," Oregon. Douglas. June–Nov.

Eriogonum nudum var. *deductum* (Greene) Jepson, Fl. Calif. 420. 1914. (*E. deductum* Greene, Pittonia 5: 71. 1902.) Smaller plant, 2–4 dm. high, with slender trichotomous branches, or an extreme form (*E. scapigerum* Eastw.) reduced to a single simple stem bearing a solitary head; flowers white tinged with rose, glabrous without. This variety inhabits the Boreal Zones of the Sierra Nevada, California.

Eriogonum nudum var. *pubiflorum* Benth. in DC. Prod. 14: 13. 1856. (*E. nudum* var. *oblongifolium* S. Wats., *E. sulphureum* Greene, *E. saxicola* Heller.) Flowers usually yellow, but sometimes white, villous-pubescent without, at least toward the base. Interior and eastern California from Modoc and Siskiyou Counties to the Mojave Desert.

Eriogonum nudum var. *pauciflorum* S. Wats. Proc. Amer. Acad. 12: 264. 1877. Branches usually many, dichotomous, and rather virgate; involucre mostly solitary or rarely in pairs in the axils and at the ends of the branchlets; calyx white, glabrous. Southern Sierra Nevada and South Coast Ranges, California, to northern Lower California. Merges with variety *pubiflorum*, and one of these intermediate forms is *E. granicum* Stokes, Gen. Eriog. 60. 1936.

72. *Eriogonum grande* Greene. Island Eriogonum. Fig. 1420.

Eriogonum grande Greene, Pittonia 1: 38. 1887.

Eriogonum nudum var. *grande* Jepson, Fl. Calif. 421. 1914.

Woody at base, the leafy branches 1–3 dm. high, terminated by stout glabrous peduncles, 5–15 dm. high. Leaves long-ovate to ovate-oblong, 2–12 cm. long, obtuse to rounded at apex, more or less cordate at base, strongly undulate-crisped on the margin, densely white-velvety beneath, green with scattering floccose tomentum above; inflorescence dichotomously or trichotomously branched; involucre 2–3 or often solitary at the nodes, prismatic, 5–6 mm. high, shallowly 5-toothed, glabrous without, pilose-tomentose on the throat within; calyx 2.5–3 mm. long, glabrous, white or tinged with rose, the lobes narrowly obovate, rounded at apex; filaments pubescent.

Hillsides and bluffs, Upper Sonoran Zone; Channel Islands (Santa Rosa, Santa Cruz, Anacapa, Santa Catalina, and San Clemente), southern California. Type locality: Santa Cruz Island, California. June–Sept.

Eriogonum rubescens Greene, Pittonia 1: 39. 1887. (*E. grande* var. *rubescens* Munz.) Low and decumbent, the peduncles 2–3 dm. long, stout; inflorescence a compact cyme; involucre several in each head, many-flowered; calyx rose red, glabrous without; filaments villous at base. Cliffs near the sea, San Miguel Island and on west end of Santa Cruz Island. Perhaps only a form of *E. grande*.

73. *Eriogonum Harfordii* Small. Harford's Eriogonum. Fig. 1421.

Eriogonum Harfordii Small, Bull. Torrey Club 25: 47. 1898.

Eriogonum capitatum Heller, Muhlenbergia 2: 27. 1905.

Eriogonum latifolium var. *Harfordii* Stokes, Gen. Eriog. 65. 1936.

Perennial by horizontal few-branched rootstocks. Leaves basal, long-petioled, the blades oblong-spatulate to elliptic-ovate, 2-4 cm. long, glabrate above, densely tomentose beneath, the margins plane or slightly undulate; flowering stems one to several, 5-10 dm. high, dichotomously branched, more or less densely lanate; involucre in heads terminating the branchlets, turbinate-campanulate, 3-5 mm. long, lanate; calyx white or rose, rarely yellowish, 3-4 mm. long, more or less villous at the base, the lobes in age obovate; filaments hairy below.

Dry slopes, mainly Transition Zone; North Coast Ranges and northern Sierra Nevada, California. Type locality: Long Valley, Mendocino County, California. May-Aug.

74. *Eriogonum elatum* Dougl. Tall Eriogonum. Fig. 1422.

Eriogonum elatum Dougl. ex Benth. Trans. Linn. Soc. 17: 413. 1937.

Eriogonum elatum var. *villosum* Jepson, Fl. Calif. 421. 1914.

Eriogonum elatum var. *incurvum* Jepson, loc. cit.

Eriogonum elatum subsp. *glabrescens* Stokes, Gen. Eriog. 98. 1936.

Herbaceous perennial with a low branched or simple woody caudex. Leaves all basal, erect, long-petioled, the blades oblong-ovate to ovate-lanceolate, 5-25 cm. long, acute or acutish at apex, obtuse or truncate and then abruptly cuneate or decurrent at base, villous-tomentose on petioles and lower surface, glabrate and green above; flowering stems 4-8 dm. high, rigid, glabrous and glaucous throughout or often short-villous toward the base and sometimes nearly throughout, cymosely branched above into small or ample compound cymes; involucre in terminal or sometimes axillary heads of 2-4, 4 mm. long, 5-toothed, glabrous or sparingly pubescent; calyx white or tinged with rose, 2.5 mm. long, pubescent without especially on the veins, the lobes obovate.

Dry hillsides, Upper Sonoran and Arid Transition Zones; northeastern Washington, south to Siskiyou and Inyo Counties, California, and western Nevada. Type locality: Columbia River (Douglas). June-Sept.

75. *Eriogonum parvifolium* Smith. Dune Eriogonum. Fig. 1423.

Eriogonum parvifolium Smith in Rees, Cycl. 13: No. 2. 1809.

Eriogonum parvifolium subsp. *lucidum* Howell ex Stokes, Gen. Eriog. 87. 1936.

Low spreading shrub, 3-10 dm. high, with slender densely leafy branches, thinly floccose. Leaves fasciculate at the nodes, round-ovate to oblong-lanceolate, 8-12 mm. long, short-petioled, thick, revolute on the margins, densely white-tomentose beneath, dark green and shining above; heads solitary or racemously disposed on a simple or umbellately branched peduncle; involucre 4 mm. long, glabrate outside, woolly on the throat within; calyx white or tinged with rose, glabrous, 3-4 mm. long, the lobes obovate; filaments sparsely hairy.

Dunes and hillsides along the coast, mainly Upper Sonoran Zone; Monterey Bay to San Diego County, California. Type locality: California (Menzies), probably Monterey. June-Dec.

76. *Eriogonum cinereum* Benth. Gray Coast Eriogonum. Fig. 1424.

Eriogonum cinereum Benth. Bot. Sulph. 45. 1844.

Straggly shrub, 6-16 dm. high, the branches tomentose. Leaves ovate, 15-25 mm. long, obtuse or rounded at apex, abruptly cuneate at base, densely white-tomentose beneath, cinereous above, the margins undulate; flowering branches elongated, sparingly branched; involucre in heads at the nodes, cylindric-turbinate, 3-4 mm. long, lanceolate, 5-toothed; calyx densely villous without, 3 mm. long, the lobes narrowly obovate; filaments glabrous.

Bluffs and foothills near the coast, Upper Sonoran Zone; southern California from Santa Barbara to San Pedro. Type locality: San Pedro, California.

77. *Eriogonum giganteum* S. Wats. Giant Eriogonum. Fig. 1425.

Eriogonum giganteum S. Wats. Proc. Amer. Acad. 20: 371. 1885.

Shrub with stout branches 1-2.5 m. high, the trunk 3-10 cm. in diameter, rough-barked, the younger branches white-tomentose, glabrate in age. Leaves tufted at the ends of the branches, ovate to oblong-ovate, 2.5-8 cm. long, thick and leathery, densely white-tomentose and conspicuously veined beneath, cinereous and often somewhat glabrate above; peduncle stout, 10-30 cm. long, loosely tomentose, glabrate in age; cymes compound, 10-30 cm. broad, leafy-bracted; involucre crowded, sessile or short-pedicelled, campanulate, 4 mm. long, the teeth short, obtuse; calyx white or rose-colored, villous-tomentose toward the base, the lobes obovate; filaments hairy.

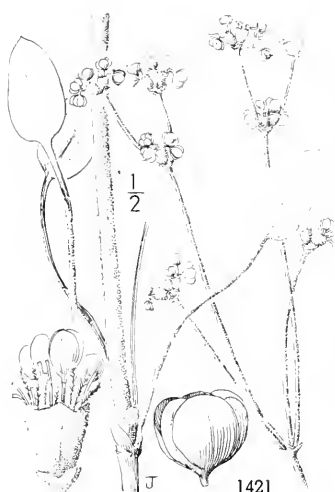
Canyons and bluffs; Channel Islands (Santa Catalina), southern California. Type locality: Santa Catalina Island, California. April-Sept. St. Catharine's Lace.

Eriogonum giganteum var. *formosum* K. Brandg. Erythea 5: 79. 1897. Leaves oblong-lanceolate, usually crenately crisped on the margins. San Clemente and Santa Barbara Islands, southern California. The plants on Santa Barbara Island have the peduncles and involucre densely and permanently white velvety-tomentose, and the leaves broadly ovate, more or less cordate at base.

78. *Eriogonum arborescens* Greene. Arborescent Eriogonum. Fig. 1426.

Eriogonum arborescens Greene, Bull. Calif. Acad. 1: 11. 1884.

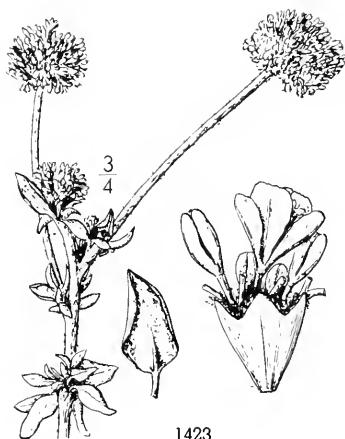
Loosely branched shrub, 5-15 dm. high, young twigs tomentose, glabrate in age, and bark of main stems shreddy. Leaves crowded at the ends of the branchlets, linear to linear-oblancheolate,



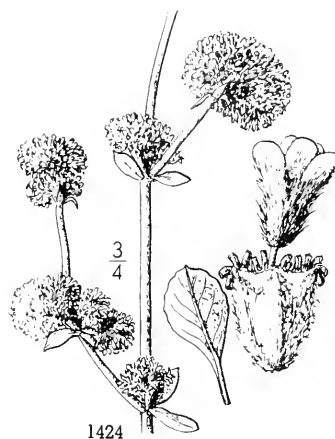
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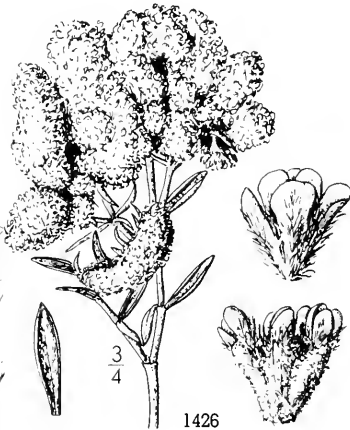
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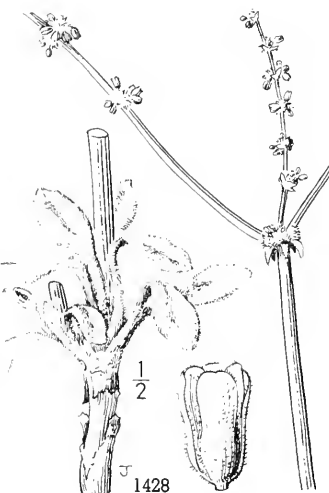
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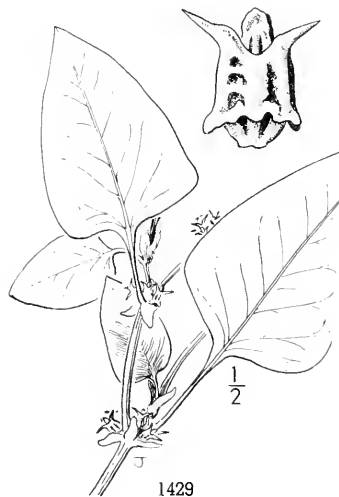
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1421. *Eriogonum Harfordii*
 1422. *Eriogonum elatum*
 1423. *Eriogonum parvifolium*

1424. *Eriogonum cinereum*
 1425. *Eriogonum giganteum*
 1426. *Eriogonum arborescens*

1427. *Eriogonum fasciculatum*
 1428. *Eriogonum intrafractum*
 1429. *Emex spinosa*

2–3 cm. long, revolute, densely white-tomentose beneath, glabrate above; flowers in a dense compound leafy-bracted cyme, 5–15 cm. broad on stout peduncles; involucre turbinate, 3 mm. long, tomentose; calyx 2 mm. long, rose or white tinged with rose, villous below.

Canyon walls and sea bluffs, Upper Sonoran Zone; Santa Rosa, Santa Cruz, and Anacapa Islands, southern California. Type locality: Santa Cruz Island. June–Sept.

79. *Eriogonum fasciculatum* Benth. California Buckwheat Brush. Fig. 1427.

Eriogonum fasciculatum Benth. Trans. Linn. Soc. 17: 411. 1837.

Eriogonum fasciculatum var. *maritimum* Parish, Muhlenbergia 3: 59. 1907.

Eriogonum rosmarinifolium Nutt. Journ. Acad. Phila. II. 1: 164. 1848.

Shrub with spreading branches, 6–12 dm. high, the branchlets leafy, rather thinly pubescent. Leaves fascicled at the nodes, linear-oblancoate, 6–15 mm. long, thick, strongly revolute, coriaceous, green and glabrate above, densely white-tomentose beneath; inflorescence cymose, terminating a naked peduncle 5–20 cm. long; bracts usually foliaceous; involucre prismatic, 3–4 mm. long, glabrate, acutely 5-toothed; calyx white or rose-tinged, 3 mm. long, glabrous without, outer lobes elliptic, the inner obovate.

Dry hillsides and canyons near the coast, Santa Barbara, California, to northern Lower California. Type locality: California (Douglas). May–Nov.

Eriogonum fasciculatum subsp. *foliolosum* (Nutt.) Stokes, Gen. Eriog. 86. 1936. Similar to the typical species but upper surface of leaves, twigs and outer surface of calyx pubescent. This subspecies is one of the important bee plants of the foothills, mesas and lower altitudes of the mountains of cismontane California from Monterey County to San Diego and adjacent Lower California.

Eriogonum fasciculatum subsp. *polifolium* (Benth.) Stokes, Gen. Eriog. 86. 1936. Leaves densely canescent or hoary above; involucre pubescent; calyx pubescent without; heads usually solitary, or cyme reduced and subcapitate. This subspecies inhabits the desert slopes from southern California to Nevada and adjacent Lower California.

80. *Eriogonum intrafractum* Coville & Morton. Jointed Eriogonum. Fig. 1428.

Eriogonum intrafractum Coville & Morton, Journ. Wash. Acad. 26: 305. 1936.

Perennial with woody taproot. Leaves restricted to the root crown, the blades oblong-ovate, rounded at apex, cuneate at base, 2.5–7 cm. long, densely pilose-tomentose on both surfaces, petioles longer than the blades; flowering stems internally articulate into segments 3–15 mm. long, usually solitary, rather stout, 8–12 dm. high, simple up to the inflorescence, glabrous; inflorescence of usually 2 or 3 virgate branches; involucre in whorls at the nodes, usually 1 in the axil of each of the three bracts, 5-parted into narrow lobes, not angled; flower-pedicle pilose; calyx yellow, tinged with rose in age, pubescent without, the lobes about equal; achene flask-shaped, triangular-beaked at apex, abruptly enlarged and prominently 3-lobed at base, strigose above.

Desert mountain slopes, Sonoran Zone; Grapevine Mountains, 2,000–5,000 feet altitude, Death Valley region, Inyo County, California. Type locality: Titus Canyon, Grapevine Mountains, Death Valley, at about 2,000 feet altitude. April–Oct. Napkin-ring Buckwheat.

9. ÈMEX Neck. Elem. 2: 214. 1790.

Glabrous herbs with alternate petiolate leaves, and membranaceous or scarious sheathing stipules. Flowers monoecious, in axillary fascicles or the upper leaves abortive and the flowers appearing racemose, the pistillate articulate on filiform pedicels, the staminate below and sessile. Calyx of the staminate flowers 5–6-parted, the segments narrow, equal; stamens 4–6. Pistillate calyx urceolate, the tube ovoid, the lobes 6 in 2 cycles. Ovary 3-angled; styles 3, short. Fruiting calyx indurate, 3- or 6-angled, forming a bur-like fruit; 3 outer lobes spine-tipped. Nut enclosed in the calyx, acutely 3-angled. [Name Latin, ex, out of, and Rumex, the original species having been formerly referred to the genus *Rumex*.]

A genus of 2 species native of the Mediterranean region, south Africa and Australia. Type species, *Rumex spinosus* L.

1. *Emex spinosa* (L.) Campd. Spiny Emex. Fig. 1429.

Rumex spinosus L. Sp. Pl. 337. 1753.

Emex spinosa Campd. Mon. Rum. 58. pl. 1. f. 1. 1819.

Glabrous monoecious annual herb. Leaves alternate, petioled, the blades 5–12 cm. long, oblong-ovate to nearly deltoid, mostly truncate or subcordate at base; calyx persistent, indurate, forming a bur-like fruit; 3 outer lobes tipped with stout divergent spines, the 3 inner ones much shorter, erect, linear-lanceolate.

Locally adventive in Ventura, Orange, and San Diego Counties, California. Native of the Mediterranean region. July–Nov.

Emex australis Steinh. Ann. Sc. Nat. II. 9: 195. 1838. Similar to *E. spinosa*. Leaves mostly cuneate at base; inner calyx-lobes broadly triangular-ovate, mucronate. Adventive in San Francisco and Vallejo, California. Native of south Africa and Australia.

10. RÙMEX L. Sp. Pl. 333. 1753.

Perennial or annual herbs with simple or branched grooved stems. Leaves entire or undulate, flat or crisped. Stipules scarious united into a sheathing, obliquely truncate cylindric sheath. Flowers green, perfect or sometimes unisexual, in simple or compound

often paniced racemes. Calyx 6-parted, the 3 outer sepals unchanged in fruit, the 3 inner ones (wings) often bearing a grain-like callosity on the back, larger and enclosing the 3-angled achene. Stamens 6; filaments short. Styles 3; stigmas peltate, tufted. Achene 3-angled. [The ancient Latin name.]

About 140 species, of wide geographic distribution. Type species, *Rumex Patientia* L.

Flowers perfect; leaves never hastate. (*Lapathum*.)

Valves 5–30 mm. long, without grains.

Leaves not cordate at base; valves over 10 mm. long, with a deep narrow sinus at base.

Valves broader than long; leaves flat.

1. *R. venosus*.

Valves longer than broad; leaves undulate.

2. *R. hymenosepalus*.

Leaves cordate at base; valves 5 mm. long, shallowly cordate, with a broad sinus.

3. *R. occidentalis*.

Valves 2–5 mm. long, at least one or more bearing a conspicuous grain-like callosity.

Margins of the valves entire or rarely inconspicuously erose (toothed in *violascens*).

Leaves more or less undulate and the margins often crisped.

Fruiting valve broadly ovate-triangular, 3–4 mm. wide; fruiting racemes appearing continuous except at base.

4. *R. crispus*.

Fruiting valves oblong-ovate, 2 mm. or less in width, more or less fiddle-shaped; fruiting racemes well interrupted.

Valves entire; grains not crenate-margined.

5. *R. conglomeratus*.

Valves toothed toward the base; grains crenate-margined.

6. *R. violascens*.

Leaves flat, not at all undulate or crisped, mostly narrow and willow-like.

7. *R. salicifolius*.

Margins of the valves with conspicuous awns or bristles.

Perennial, glabrous; teeth of the valves spinose or awl-like.

Branches of the panicle divaricate; pedicels stout, shorter than the thick undurated valves.

8. *R. pulcher*.

Branches of the panicle ascending; pedicels slender, longer than the thin herbaceous valves.

9. *R. obtusifolius*.

Annual, short-pubescent; teeth of the valves composed of a few conspicuous bristles.

10. *R. persicarioides*.

Flowers dioecious; valves small, without grain-like callosities. (*Acetosa*.)

Leaves tapering at base, never hastate; valves surpassing the achene.

11. *R. paucifolius*.

Leaves hastate at base, at least some of them; valves shorter than the achene.

12. *R. acetosella*.

1. *Rumex venosus* Pursh. Veined or Winged Dock. Fig. 1430.

Rumex venosus Pursh, Fl. Amer. Sept. 733. 1814.

Perennial herb from a woody rootstock, glabrous and rather pallid, the stems stout, erect, 15–45 cm. high, simple or few-branched, somewhat flexuous. Leaves ovate to oblong-lanceolate, 3–10 cm. long, acute or acuminate at apex, narrowed to the petiole at base, rather firm-coriaceous; racemes one to several, erect, and more or less interrupted; pedicels elongated; valves reddish, becoming 15–30 mm. broad, orbicular, deeply cordate, with a deep narrow sinus, veiny and reddish; pedicels nearly as long as the wings, jointed near the middle; achenes 5 mm. long, smooth and shining, the sides concave, the angles margined.

Dry stream beds, usually in sandy soil, Upper Sonoran and Arid Transition Zones; eastern Washington southward through eastern Oregon to northeastern California, and eastward to Saskatchewan and Missouri. Type locality: "in upper Louisiana." Sour Greens, Wild Begonia. April–June.

2. *Rumex hymenosepalus* Torr. Canaigre. Fig. 1431.

Rumex hymenosepalus Torr. Bot. Mex. Bound. 177. 1849.

Perennial arising from a cluster of rather large whitish tuberous roots, glabrous and usually pallid-green, the stems stout, leafy, simple or branched, 4–6 dm. high. Leaves oblong to broadly lanceolate, 6–30 cm. long, strongly undulate, acute at apex, narrowed at base to a short thick fleshy petiole; racemes paniced, about 10–30 cm. long; pedicels 6–12 mm. long; valves 8–12 mm. broad, deeply cordate, strongly reticulate-veined, without grains, rose-colored; achene smooth and shining, sharply angled, 4 mm. long.

Dry sandy plains and washes, Upper and Lower Sonoran Zones; Kern and San Luis Obispo Counties, California, to Lower California, New Mexico, and western Texas. Type locality: "Sandy soils, from El Paso to the canyons of the Rio Grande." Wild Rhubarb. Dec.–May.

3. *Rumex occidentalis* S. Wats. Western Dock. Fig. 1432.

Rumex occidentalis S. Wats. Proc. Amer. Acad. 12: 253. 1876.

Rumex procerus Greene, Pittonia 4: 305. 1901.

Rumex fenestratus Greene, Pittonia 4: 306. 1901.

Rumex confinis Greene, loc. cit.

Perennial from a stout taproot, glabrous, the stem stout, erect, 6–20 dm. high, simple or sparingly branched, deeply grooved. Leaves lanceolate or ovate-lanceolate, somewhat crisped on the margin, the lower 1–4 dm. long, obtuse or acutish at apex, cordate or subcordate at base, long-petioled, the upper reduced, lanceolate, narrowed at base; racemes erect, forming rather a strict dense panicle 3–6 dm. long, the lower leafy; pedicels 5–15 mm. long, obscurely jointed below the middle; valves triangular-ovate, 5–8 mm. long, shallowly cordate at base, somewhat denticulate, prominently reticulate-veined, without grains; achene 4 mm. long, short-pointed, chestnut brown, smooth and shining.

Bogs and marshes, often in brackish places, mainly Boreal and Transition Zones; Alaska to Labrador, south in the Pacific States to San Francisco Bay, Klamath Lake, and adjacent northeastern California, eastward to Colorado, Minnesota, and Maine. Type locality: only the general range given. June–Oct.

4. *Rumex crispus* L. Curly-leaved or Yellow Dock. Fig. 1433.*Rumex crispus* L. Sp. Pl. 335. 1753.

Perennial from a taproot, glabrous and dark green; stems rather slender, erect, 3–12 dm. high, simple or branched above, the branches erect. Leaves distinctly crisped and wavy-margined, the lower oblong to oblong-lanceolate, 10–30 cm. long, long-petioled, the upper smaller and narrower with short petioles, all cordate or obtuse at the base; flowers rather loosely whorled; racemes 8–15 cm. long, forming an open or rather strict panicle; pedicels jointed at the base, longer than the fruit; valves 3–4 mm. long, broadly ovate, truncate or cordate at base, somewhat erose-dentate, each bearing a small oblong grain; achene dark brown, shining, 2 mm. long.

Fields and waste places; a cosmopolitan weed, widely distributed in the Pacific States and over the United States and Canada generally. Naturalized from Europe. April–Aug. or in California throughout the year.

Rumex sanguineus L. Sp. Pl. 334. 1753. (Bloody or Red-veined Dock.) This European species has been found on ballast and waste land at Linnton, Oregon. It is easily confused with *R. crispus* and *R. conglomeratus*. From *crispus* it is distinguished by short pedicels and only 1 valve grain-bearing; from *conglomeratus* by its leafless inflorescence.

5. *Rumex conglomeratus* Murr. Green or Clustered Dock. Fig. 1434.*Rumex conglomeratus* Murr. Prod. Fl. Goett. 52. 1770.

Perennial, from a stout taproot, glabrous, rather light green; stem slender, erect, simple or usually branched above, 4–15 dm. long, oblong to oblong-lanceolate, the lower 10–20 cm. long, acute at apex, obtuse, rounded or subcordate at base, obscurely crisped on the margin, the upper much reduced; panicle very loose, with elongated somewhat spreading branches; flower clusters distant, forming much interrupted leafy-bracted racemes; pedicels but little longer than the fruit or often shorter, jointed near the base; valves fiddle-shaped, 3 mm. long, entire or obscurely toothed at the base, each bearing a rather large oblong grain; achenes 2 mm. long, reddish brown, smooth and shining.

Low moist ground, Upper Sonoran and Transition Zones; rather a common weed in the Pacific States, naturalized from Europe. May–Oct.

6. *Rumex violascens* Rech. f. Sonora Dock. Fig. 1435.*Rumex violascens* Rech. f. Rep. Spec. Nov. 39: 171. 1936.

Perennial, glabrous, from an elongated taproot, dark green, usually tinged with red; stems erect, stout, 3–8 dm. high, simple or sparingly branched. Lower leaves narrowly oblong or spatulate, 4–10 cm. long, flat or obscurely crisped, the upper reduced and mostly linear-lanceolate; racemes interrupted, ascending, 5–12 cm. long forming rather a narrow leafy-bracted panicle; flower clusters dense; pedicels jointed below the middle, about as long as the fruit; valves 3–4 mm. long, narrowly ovate-triangular, the apex more or less prolonged, erose or few-toothed toward the base, all bearing rather prominent oblong grains, with crenate margins; achene 2.5 mm. long, brown, smooth and shining.

Low moist ground, Sonoran Zones; Colorado Desert, southern California, Arizona, and Texas, south to central Mexico. Type locality: Tampico, Mexico. March–Aug. This species has been confused with *R. Berlandieri* Meissn.

7. *Rumex salicifolius* Weinm. Willow Dock. Fig. 1436.*Rumex salicifolius* Weinm. Flora 4: 28. 1821.*Rumex crassus* Rech. f. Rep. Spec. Nov. 40: 295. 1936.*Rumex transitorius* Rech. f. op. cit. 296.

Perennial from a stout taproot, the stems usually several, decumbent or more commonly prostrate, 3–7 dm. long, leafy, strongly grooved. Leaves linear-lanceolate to oblong-lanceolate, 6–12 cm. long, acute at apex, obtuse at base, bright green, flat, entire; petioles of the lower leaves long as the blades, the upper much shorter; racemes short and congested into a dense spike-like panicle, or sometimes more open; pedicels jointed near the base; valves deltoid, 3 mm. long, truncate at base; one or rarely two of the wings with a large grain broader than the free margin of the wing; seeds broadly ovoid-triquetrous, 2.5 mm. long, smooth and shining.

Low moist ground, Upper Sonoran and Transition Zones; mostly near the coast, Vancouver Island, British Columbia to southern California. Type locality: San Francisco, California. May–Sept.

Rumex salicifolius var. *denticulatus* Torr. Bot. Mex. Bound. 178. 1859. (*Rumex lacustris* Greene, Erythraea 3: 63. 1895. *Rumex salicifolius* var. *montigenitus* Jepson, Man. Fl. Pl. Calif. 292. 1925. *Rumex californicus* Rech. f. Rep. Sp. Nov. 40: 297. 1936. *Rumex trianguvalvis* (Danser) Rech. f. Field Mus. Bot. Ser. 17: 64. 1937. as to Pacific Coast plants.) Perennial from a stout taproot, glabrous and pale green, the stems erect or decumbent, 3–6 dm. high. Leaves linear-lanceolate or oblong-lanceolate, 5–15 cm. long, acute at apex, cuneate to rounded at base; valves deltoid-ovate, 4–6 mm. long, acute at apex, truncate at base, all three wings with rather small oblong grains much narrower than the free margin of the wing, or the grains all wanting; seed 2 mm. long, broadly ovoid-triquetrous. Low ground, Upper Sonoran to Boreal Zones; Washington to southern California. Type locality: California. May–Oct.

8. *Rumex pulcher* L. Fiddle Dock. Fig. 1437.*Rumex pulcher* L. Sp. Pl. 336. 1753.

Perennial, the stems erect, 5–8 dm. high, rather slender, with rigid divaricately spreading branches. Lower leaves long-petioled, oblong or some of them fiddle-shaped, 3–15 cm. long, obtuse at apex, cordate at base, scabrous beneath, the upper ones short-petioled, smaller and narrowed at both ends; flowers in a loose panicle with elongated divergent branches, the clusters rather remote, naked or leafy; pedicels jointed at or below the middle, about equaling the fruit; valves ovate or oblong-ovate, 4 mm. long, usually of unequal size, spiny-toothed, truncate at base; two or sometimes all three bearing small grains; achene about 2 mm. long, smooth and shining.

Waste places, becoming rather widely introduced in California. Native of Europe. May–Sept.



1430. *Rumex venosus*
 1431. *Rumex hymenosepalus*
 1432. *Rumex occidentalis*

1433. *Rumex crispus*
 1434. *Rumex conglomeratus*
 1435. *Rumex violascens*

1436. *Rumex salicifolius*
 1437. *Rumex pulcher*
 1438. *Rumex obtusifolius*

9. *Rumex obtusifolius* L. Bitter Dock. Fig. 1438.*Rumex obtusifolius* L. Sp. Pl. 335. 1753.

Perennial from a stout taproot, glabrous, dark green; stem stout, erect, simple or sparingly branched, 6–12 dm. high. Lower leaves broadly oblong-lanceolate, 10–35 cm. long, long-petioled, acutish or obtuse at the apex, cordate or rounded at base, the margins slightly undulate and crisped, the upper much reduced and short-petioled; panicle rather open, leafy. the racemes elongated, but little interrupted; pedicels longer than the fruit, jointed below the middle; valves 4–5 mm. long, hastate, margins with a few spreading spinose teeth, one of them bearing a small grain; achene 2 mm. long, reddish brown, shining.

A weed in low moist ground, Upper Sonoran and Transition Zones; frequent in the Pacific States, and widely distributed over the continent, naturalized from Europe. June–Dec.

10. *Rumex persicarioides* L. Golden Dock. Fig. 1439.*Rumex persicarioides* L. Sp. Pl. 335. 1753.

Annual, pubescent, rather pale yellowish green, the stem stout, leafy, simple or diffusely branched, 3–10 dm. high. Leaves lanceolate, 3–25 cm. long, the lower often cordate or sagittate at base, the upper narrowed, the margins undulate and often crisped; flower-whorls crowded in dense or somewhat interrupted leafy compound racemes; pedicels very short; valves rhombic-oblong, attenuate at apex, each bearing 1–3 elongated bristles on each margin, and an oblong grain on the back; achene 1.5 mm. long, smooth and shining, the sides slightly convex and the angles somewhat winged.

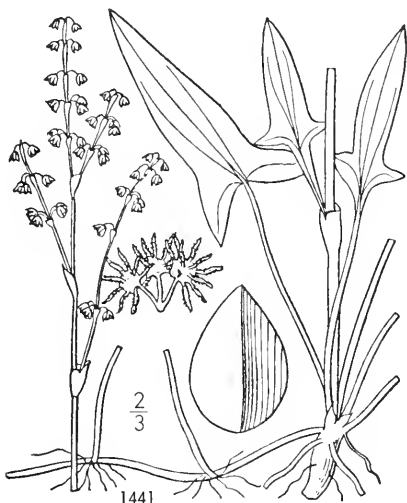
Wet, especially brackish places, Upper Sonoran and Transition Zones; British Columbia to southern California and across the continent. Closely related to *R. maritimus* L. of the Old World. Recently our plants have been referred to *R. fuginus* Philippi, of Chile, by Rech. f. Field Mus. Bot. Ser. 17: 136. 1937. Type locality: Virginia. May–Sept.



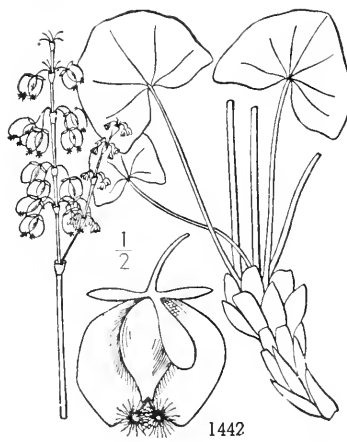
1439



1440



1441



1442

1439. *Rumex persicarioides*
1440. *Rumex paucifolius*

1441. *Rumex Acetosella*
1442. *Oxyria digyna*

11. *Rumex paucifolius* Nutt. Alpine Sheep Sorrel. Fig. 1440.

Rumex paucifolius Nutt. Journ. Acad. Phila. 7: 49. 1834.

Rumex Engelmannii var. *Geyeri* Meissn. in DC. Prod. 14: 64. 1856.

Rumex Geyeri Trelease, Rep. Mo. Bot. Gard. 3: 78. 1892.

Rumex paucifolius var. *gracilescens* Reeb. f. Field Mus. Bot. Ser. 17: 27. 1937.

Perennial from a stout simple or branched taproot, the stems 2-7 dm. high. Leaves mostly basal, linear to oblong-lanceolate, 4-10 cm. long, entire, narrowed to petioles of about the same length to twice as long; panicles naked; flowers becoming reddish; valves 2.5-3 mm. long, suborbicular, cordate, finely veined, without grains; achenes smooth, 1 mm. long.

Mountain meadows and streams, Boreal Zones; British Columbia and Alberta south to Colorado, Utah, and the Sierra Nevada, California. Type locality: "Near Flat-Head River." June-Sept.

12. *Rumex Acetosella* L. Sheep Sorrel. Fig. 1441.

Rumex Acetosella L. Sp. Pl. 338. 1753.

Diocious perennial by slender running rootstocks, the stems slender, erect or decumbent at base, simple or branched, 2-4 dm. high, glabrous. Leaves narrowly hastate, 2.5-8 cm. long, the uppermost subentire; petioles of the lower leaves often longer than the blades; panicles naked, narrow, turning red in age; calyx 1 mm. long, green; stamens exserted; valves scarcely equaling the granular achene.

Open grassy slopes and fields, Upper Sonoran to Boreal Zones; widely introduced in the Pacific States, native of Europe. The foliage acid. Feb.-Sept.

11. *OXYRIA* Hill, Veg. Syst. 10: 24. 1765.

Low glabrous perennial, with a thick chaffy rootstock, erect stems and acrid juice. Leaves mostly basal, long-petioled, rounded or reniform, their stipule-sheaths cylindric. Flowers perfect, small, green, verticillate, the verticils arranged in terminal paniced racemes. Sepals 4, the outer larger than the inner. Stamens 6, included; filaments subulate. Ovary 1-celled; style short, 2-parted; stigmas fimbriate, persistent; achene lenticular, the body ovate with two broad wings. [Greek, meaning sour, in reference to the acid juice of the leaves.]

Two species, the following which is the generic type, the other Himalayan.

1. *Oxyria digyna* (L.) Hill. Mountain Sorrel. Fig. 1442.

Rumex digynus L. Sp. Pl. 337. 1753.

Oxyria digyna Hill, Hort. Kew. 158. 1768.

Stems usually several from a stout chaffy rootstock, scape-like, simple or few-branched, 5-25 cm. high. Leaves mostly basal, reniform or orbicular-reniform, 15-35 mm. wide, undulate; stipule-sheaths loose, oblique; racemes many-flowered; pedicels slender, recurved; sepals red or greenish, 1.5-2 mm. long, the inner erect in fruit and 4-6 mm. long, the outer reflexed; achene with broad membranous wings.

Among rocks, Arctic-Alpine and Hudsonian Zones; Alaska to Greenland, south in the Pacific States to San Bernardino Mountains, California, in the Rocky Mountains to New Mexico, and in the east to the White Mountains, New Hampshire; also boreal and alpine Europe and Asia. Type locality: in Europe. July-Sept.

12. *POLYGNUM* [Tourn.] L. Sp. Pl. 359. 1753.

Annual or perennial terrestrial or aquatic herbs, or sometimes shrubby, usually with swollen joints. Stipules united into a prominent sheath or sometimes obsolete. Leaves alternate, entire, the petioles often articulate with the ocreae. Flowers mostly perfect, axillary or racemose on jointed pedicels. Calyx 5-parted or sometimes 6-parted, often petaloid, similar and erect in fruit. Stamens 3-9, but usually 5; filaments often dilated. Styles or stigmas 2 or 3. Achenes 3-angled, or lenticular, enclosed by the persistent calyx. Embryo slender curved around one side of the endosperm; cotyledons incumbent or accumbent. [Name Greek, meaning many knees in reference to the jointed stems.]

About 200 species of wide geographical distribution. Type species, *Polygonum aviculare* L.

Plants not twining; outer sepals not winged or keeled (see *P. cuspidatum* and *P. sachalinense*).

Stipule-sheaths, at least at length deeply lacerate, mostly 2-lobed; leaves small; flowers in 1- to few-flowered axillary clusters, scattered or in leafy-bracted spikes or racemes; cotyledons incumbent.

Leaves articulate with the sheath, 1-nerved; flowers 2 or more rarely solitary in the axils; short-pedicelled.

Leaves not articulate, narrow and acicular, 3-nerved, the two lateral marginal; flowers solitary in the axils; sessile.

Stipule-sheaths not 2-lobed nor lacerate; flowers in racemes or spikes terminating the branches, not leafy-bracted; cotyledons accumbent.

Stems simple, from fleshy rootstocks; basal leaves long-petioled, the cauline short-petioled or sessile; raceme solitary, terminal.

Stems branched; leaves all cauline and similar; racemes terminating the branches.

Sheaths funnelform, oblique and more or less open on the side facing the leaf, naked at apex.

Sheaths cylindric, truncate, naked or ciliate-fringed at apex.

Plants herbaceous twining vines; leaves cordate to hastate at base; outer calyx-lobes keeled or winged.

I. AVICULARIA.

II. DUVARIA.

III. BISTORTA.

IV. ACONOGNUM.

V. PERSICARIA.

VI. BILDERDYKIA.

I. AVICULÀRIA

Suffrutescent perennials; leaves articulate at the junction with the stipule-sheath.

Midrib of leaf prominent with a 2-winged keel; style 3-cleft to above the middle; maritime. 1. *P. Paronychia*.

Midrib of leaf not prominent or keeled; style 3-parted to the base; alpine species. 2. *P. shastense*.

Annuals, except *P. Fowleri*.

Stems terete or nearly so.

Achenes conspicuously exserted.

Prostrate maritime perennial; achene broadly ovoid.

3. *P. Fowleri*.

Erect annual; achene narrowly ovoid.

4. *P. exsertum*.

Achenes nearly or quite included.

Calyx-lobes with white or pink margins; 2 mm. or less in length.

Achenes striate; flowers borne in the axils of leaves little reduced; plants mostly prostrate or ascending. 5. *P. aviculare*.

Achenes smooth and shining; flowers borne in the axils of much reduced leaves, appearing spicate. 6. *P. argyrocoleon*.

Calyx-lobes with yellowish margins and green midrib, 2.5–3 mm. long.

Leaves elliptic, obtuse.

7. *P. erectum*.

Leaves lanceolate, acute.

8. *P. ramosissimum*.

Stems rather sharply angled at least toward the ends of the branches, less so in *minimum*.

Fruit deflexed on recurved pedicels.

Achenes oblong; calyx 3–5 mm. long.

Calyx 4–5 mm. long.

9. *P. majus*.

Calyx 3 mm. long.

10. *P. Douglasii*.

Achenes ovoid; calyx 2 mm. long.

11. *P. Austiniae*.

Fruit remaining erect, the pedicels not becoming recurved.

Flowers in small axillary clusters, distributed along more or less the length of the branches.

Stems rather obscurely angled; leaves ovate to oblong-ovate, not markedly reduced above.

12. *P. minimum*.

Stems distinctly angled; leaves oblanceolate, the upper much reduced.

13. *P. sawatchense*.

Flowers in interrupted or spicate terminal racemes.

Spikes mostly interrupted, sometimes congested in *spergulariaeforme*.

Calyx 3 mm. long; styles 3-parted to the middle; filaments not broadly dilated at base.

14. *P. spergulariaeforme*.

Calyx 2 mm. long; styles 3-parted to the base; filaments broadly dilated at base.

15. *P. Nuttallii*.

Spikes congested and mostly continuous.

Achenes brown, smooth; bracts linear, similar to the leaves and little reduced; stigmas sessile or subsessile on the ovary.

16. *P. Kelloggii*.

Achenes black, striately roughened; style evident, cleft to below the middle.

Bracts oblong, conspicuously white-margined.

17. *P. polygaloides*.

Bracts linear-lanceolate, not white-margined.

18. *P. confertiflorum*.

II. DUVÀRIA

Perennial with a branched woody rootstock.

19. *P. Bolanderi*.

Annual.

Stipule-sheaths conspicuously and deeply lacerate into several to many bristle-like segments.

Segments of the sheath several, subulate and rather firm.

20. *P. californicum*.

Segments of the sheath numerous, finely capillary and weak or cottony.

21. *P. Perryi*.

Stipule-sheaths split into two oblong-ovate segments, these sharply serrate at apex.

22. *P. Bidwelliae*.

III. BISTÓRTA

Racemes narrowly cylindric; achenes granular and dull; basal leaves usually cordate or subcordate at base.

23. *P. viviparum*.

Racemes oblong; achenes smooth and shining; basal leaves acuminate at base.

24. *P. bistortoides*.

IV. ACONÓGONUM

Flowers in leafless or nearly leafless panicles.

25. *P. phytolaccaefolium*.

Flowers in 2–4-flowered axillary clusters.

Leaves soft-pubescent, short-petioled; achene obovoid.

26. *P. Newberryi*.

Leaves sessile, more or less scabrous; achene ovoid.

27. *P. Davisiae*.

V. PERSICÀRIA

Perennials.

Spikes solitary, rarely in pairs; stamens 5; flowers rose-red; stipule-sheaths not bristly-ciliate.

Peduncles glabrous or nearly so; spikes ovoid or oblong, mostly 15–25 mm. long.

28. *P. natans*.

Peduncles glandular-hispid; spikes cylindric, 3–10 cm. long.

29. *P. coccinium*.

Spikes several to many, paniculate; stamens 8; stipule-sheaths bristly-ciliate.

Calyx not glandular-punctate; stipule-sheaths hairy.

30. *P. hydropiperoides*.

Calyx glandular-punctate.

Achenes dull.

31. *P. Hydropiper*.

Achenes shining.

32. *P. punctatum*.

Annuals; spikes paniculate; stamens usually 6.

Stipule-sheaths bristly-ciliate.

33. *P. Persicaria*.

Stipule-sheaths naked or very short-glandular-ciliate.

Achenes suborbicular, 2.5–2.9 mm. broad; peduncles stipitate-glandular.

34. *P. pennsylvanicum*.

Achenes ovate, 1.5–2 mm. long; peduncles glabrous or slightly glandular.

35. *P. lapathifolium*.

VI. BILDERDÝKIA

Twining or trailing annual; leaves cordate.

36. *P. Convolvulus*.

1. *Polygonum Paronychia* Cham. & Sch. Beach Knotweed. Fig. 1443.

Polygonum Paronychia Cham. & Sch. *Linnaea* 3: 51. 1828.

Stems suffrutescent, much branched, prostrate or ascending, 2–10 dm. long, from a thick woody rootstock, the older branches clothed with hyaline lacerated sheaths. Leaves usually crowded, linear to oblong-lanceolate, 5–25 mm. long, articulate at the junction with the stipule-sheath, strongly revolute, punctate and bright green on the upper surface, midrib on the lower surface prominent with a 2-winged keel ciliate on the edges; flowers in the upper axils, crowded at the ends of the branches; calyx tinged with rose; stamens 8; style 3-cleft to near the middle; achene 3-angled, 4.5–5 mm. long, black, smooth and shining.

Sandy soils along the coast, Boreal and Humid Transition Zones; Vancouver Island, British Columbia, to Monterey, California. Type locality: San Francisco, California. March–Sept.

2. *Polygonum shastense* Brewer. Shasta Knotweed. Fig. 1444.

Polygonum shastense Brewer ex A. Gray, *Proc. Amer. Acad.* 8: 400. 1872.

Stems woody, prostrate or ascending, 1–3 dm. long, much branched from the stout woody root. Leaves flat, but often becoming strongly revolute in age, oblong to oblong-ob lanceolate, acute or obtuse at apex, narrowed to the articulate base, 5–15 mm. long, glabrous on both sides, the midrib not winged; stipule-sheaths and bracts little or not at all lacerated; flowers in axillary clusters of 2 or 3; calyx rose-colored, with a dark midvein; stamens 8; styles 3-parted to the base; achene 3-angled, 3.5–4 mm. long, oblong-ovoid, narrowed at both ends, chestnut brown, smooth and shiny.

Rocky or gravelly slopes, Hudsonian Zone; Cascade Mountains, Douglas County, Oregon, to the southern Sierra Nevada, California, east to western Nevada. Type locality: Mount Shasta to Carson Pass, California. July–Sept.

3. *Polygonum Fowleri* Robinson. Fowler's Knotweed. Fig. 1445.

Polygonum Fowleri Robinson, *Rhodora* 4: 67. 1902.

Polygonum Rayi, American authors, not Babington.

Herbaceous perennial, pale green or slightly glaucous, the stems prostrate, much branched, 1–6 dm. long. Leaves pale green, elliptic to oblong-obovate, 6–25 mm. long, about equaling the internodes, obtuse at apex; stipule-sheaths silvery, becoming lacerate; flowers 2–4 in the axils; calyx-lobes oblong, greenish, usually with white or roseate margins; achene ovoid, 3-angled, 4–5 mm. long, well exceeding the calyx; style 3-parted to the base.

Seashores, Canadian and Humid Transition Zones; Alaska to the Puget Sound, Washington, also on the Atlantic Coast from New Brunswick to Maine. Type locality: New Brunswick. July–Sept.

4. *Polygonum exsertum* Small. Long-fruited Knotweed. Fig. 1446.

Polygonum exsertum Small, *Bull. Torrey Club* 21: 172. 1894.

Erect branching annual, 4–8 dm. high, the stems slender, conspicuously striate. Leaves 1.5–3.5 cm. long, lanceolate to rarely oblanceolate, acute at apex, attenuate at base, subsessile; stipule-sheaths soon lacerate, silvery; calyx-lobes 6, greenish with white margins; stamens 5 or 6; achene 3-angled, 5–8 mm. long, brown, smooth and shining, much exserted.

Usually in sandy alkaline or brackish soils, Transition Zone; Blue Mountains, Washington, and Saskatchewan, to Nebraska, New Brunswick, and New Jersey. Type locality: not definitely stated. Aug.–Oct.

5. *Polygonum aviculare* L. Common or Yard Knotweed. Fig. 1447.

Polygonum aviculare L. *Sp. Pl.* 362. 1753.

Annual with pale or bluish green foliage, the stems slender, prostrate or ascending, simple or often much branched, 1–12 dm. long. Leaves lanceolate to oblong-ob lanceolate, 6–20 mm. long, acute or acutish or sometimes obtuse; stipule-sheaths silvery, becoming lacerate; axillary clusters 1–5-flowered; calyx-lobes 5, scarcely 2 mm. long, green with pinkish or white margins; stamens 8, rarely 5; achene dull, minutely granular-striate, included or only the acute tip exserted.

A cosmopolitan weed, common in waste places, especially about yards and along paths. Native of Eurasia. May–Nov.

Polygonum aviculare var. *angustissimum* Meisn. in DC. *Prod.* 14: 98. 1857. (*P. neglectum* Besser.) Leaves narrowly linear-lanceolate; achenes acuminate. About as widely distributed as the typical species.

Polygonum aviculare var. *littorale* (Link.) Martens & Koch, *Deutsche Fl.* 3: 59. 1831. Prostrate or sometimes dwarfed and erect, diffusely branched from the base, the internodes often very short. Leaves mostly obtuse, thick; achenes somewhat shining, obscurely punctate. Along the coast of the Pacific States and in saline soils of interior valleys, also Atlantic States and Europe.

6. *Polygonum argyrocoleon* Steudel. Silver-sheathed or Persian Knotweed. Fig. 1448.

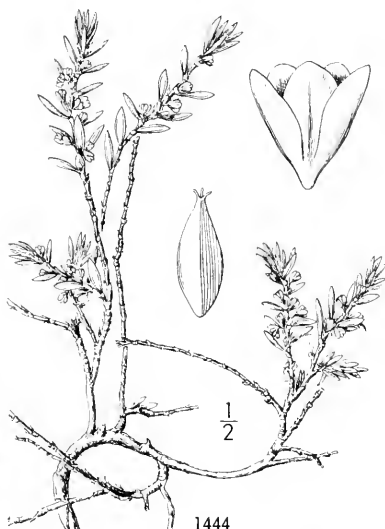
Polygonum argyrocoleon Steudel ex Kunze, *Linnaea* 20: 17. 1847.

Annual with pale green foliage, the stems erect with ascending branches, striate. Leaves linear, 1–3 cm. long, acute or acutish at apex, narrowed at base; stipule-sheaths silvery above and becoming lacerate, the lower parts pale brown; upper leaves reduced to inconspicuous bracts, the inflorescence appearing narrowly racemose or spicate; flowers several in a cluster; pedicels exserted; calyx-lobes 6, green with roseate margins, 1.5 mm. long; stamens 6; achenes 3-angled, ovoid, closely enveloped by the calyx-lobes, brown, smooth and shining.

Recently introduced species, especially in alfalfa fields; Sacramento, San Joaquin, and Imperial Valleys, and San Luis Obispo County, California, also southern Arizona. Native of Persia. June–Sept.



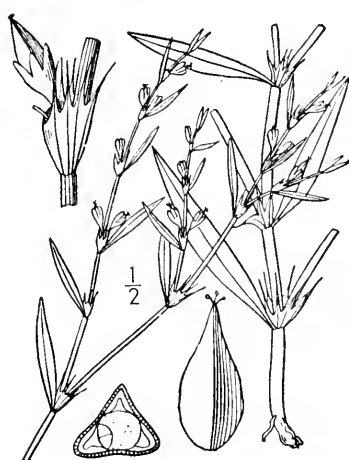
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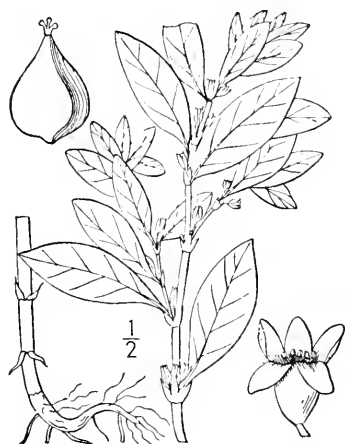
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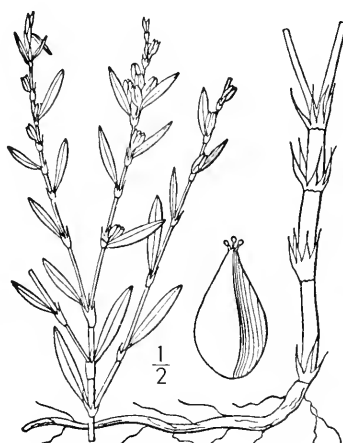
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1443. *Polygonum Paronychia*
 1444. *Polygonum shastense*
 1445. *Polygonum Fowleri*

1446. *Polygonum exsertum*
 1447. *Polygonum aviculare*
 1448. *Polygonum argyrocoleon*

1449. *Polygonum erectum*
 1450. *Polygonum ramosissimum*
 1451. *Polygonum majus*

7. *Polygonum erectum* L. Erect Knotweed. Fig. 1449.

Polygonum erectum L. Sp. Pl. 363. 1753.

Annual with glabrous yellowish green foliage, the stem erect or ascending, 2-9 dm. high, simple to much branched, strongly striate. Leaves elliptic-lanceolate, oval or obovate, 1-6 cm. long, obtuse or acutish at apex, narrowed at base to a short petiole; stipule-sheaths prominent, united only near the base; axillary clusters mostly 1-2-flowered; calyx 3 mm. long, greenish yellow; stamens 6 or sometimes 5; achenes ovoid, 3-angled, 2-3 mm. long, closely invested by the calyx-lobes or the tip slightly protruding.

Dry or moist soil, Upper Sonoran and Arid Transition Zones; eastern Oregon, near Lakeview, east to Idaho, Utah, New Mexico, and the Atlantic States. Type locality: Philadelphia. June-Sept.

8. *Polygonum ramosissimum* Michx. Yellow-flowered or Bush Knotweed. Fig. 1450.

Polygonum ramosissimum Michx. Fl. Bor. Amer. 1: 237. 1803.

Annual with glabrous usually yellowish green foliage, the stems erect or ascending, often much branched, slender and usually rigid, 1-10 dm. high. Leaves lanceolate, acute at both ends, 2-5 cm. long; stipule-sheaths silvery, becoming deeply lacerate; axillary clusters several-flowered; pedicels exserted; calyx-lobes 5 or 6, yellow or with yellowish margins, 2.5-3 mm. long; stamens 3-6; achene 3-angled, ovoid, included, black, smooth and shining.

Dry plains and hills, Upper Sonoran and Arid Transition Zones; eastern Washington to Nevada, southern California, Texas, and the Atlantic States. Type locality: "In regione Illinoisense." July-Sept.

9. *Polygonum majus* (Meisn.) Piper. Palouse Knotweed. Fig. 1451.

Polygonum coarctatum var. *majus* Meisn. in DC. Prod. 14: 101. 1856.

Polygonum majus Piper in Piper & Beattie, Fl. Palouse Reg. 63. 1901.

Annual, the stems erect, 15-35 cm. high, usually much branched, slender and wiry, inconspicuously striate. Leaves linear-lanceolate, 2-6 cm. long, stipule-sheaths 15-20 mm. long; flowers remote, in elongated spikes, subtended by short subulate bracts; calyx campanulate, the lobes 4-5 mm. long, white with a simple green midvein; styles 3-cleft to the middle; achenes reflexed, 3-angled, 3-3.5 mm. long, acuminate, black, smooth and shining.

Sterile stony ground, Arid Transition Zone; Chelan County, eastern Washington, to Klamath County, Oregon, east to Idaho. Type locality: along the Columbia, eastern Washington. Collected by Douglas. May-July.

10. *Polygonum Douglasii* Greene. Douglas' Knotweed. Fig. 1452.

Polygonum Douglasii Greene, Bull. Calif. Acad. 1: 125. 1885.

Polygonum exile Eastw. Proc. Calif. Acad. III. Bot. 2: 286. 1902.

Annual, pale green and somewhat glaucous, the stems erect, slender, 2-5 dm. high, usually sparingly branched, glabrous or somewhat scabrous about the nodes, terete or slightly ridged. Leaves oblong to narrowly lanceolate, 1-5 cm. long, 2-8 mm. wide, obtuse to acute, sessile or nearly so, thin and plane on the margins, revolute, the articulation with the sheath conspicuous, stipules at length lacerate, the sheathing portion very short; flowers drooping, 1-3 in a cluster, borne in all but the lowest axils; pedicels 2-3 mm. long, reflexed; calyx greenish, 3-4 mm. long, the lobes oblong, with white or roseate margins; stamens 8; styles very short, 3-parted to the base; achene 3-angled, included, oblong to oblong-ovoid, black, smooth and shining.

Rocky or sandy soils, Transition and Boreal Zones; British Columbia to the mountains of southern California, east to the Rocky Mountains, and locally to the north Atlantic States. Type locality: not designated. June-Sept.

Polygonum Douglasii var. *latifolium* (Engelm.) Greene, Bull. Calif. Acad. 1: 125. 1885. (*P. montanum* (Small) Greene; *P. Howellii* Greene.) Stems stouter, simple or sparingly branched. Leaves oblong or oblanceolate, 10-45 mm. long; flowers more crowded; the bracts linear-subulate, the lower foliaceous. Olympic and Cascade Mountains, south to the mountains of northern California. Usually at higher elevations than the typical species.

11. *Polygonum Austiniae* Greene. Austin's Knotweed. Fig. 1453.

Polygonum Austiniae Greene, Bull. Calif. Acad. 1: 212. 1885.

Polygonum Douglasii var. *Austiniae* Jones, Contr. West. Bot. No. 12: 75. 1908.

Erect annual, 6-15 cm. high, branched from the base. Leaves ovate, elliptic-ovate, or ovate-lanceolate, 5-12 mm. long, acute at apex, basal narrowed to a petiole, cauline sessile, uppermost reduced to bracts; flowers in all but the very lowest axils, solitary or in pairs, drooping; calyx 2-2.5 mm. long, the lobes with green midrib and white margins; achene 2.5-3 mm. long, black, smooth and shining.

Dry ridges, mainly Arid Transition Zone; Wheeler County, eastern Oregon, to Modoc County, California, east to southern Idaho. Type locality: sagebrush plains, Modoc County, California. June-Aug.

12. *Polygonum minimum* S. Wats. Leafy Dwarf Knotweed. Fig. 1454.

Polygonum minimum S. Wats. Bot. King Expl. 315. 1871.

Polygonum Torreyi S. Wats. Amer. Nat. 7: 664. 1873.

Annual, usually somewhat scurfy, the stems slender, simple or branched from the base, leafy throughout, 5-15 cm. high. Leaves ovate to ovate-lanceolate, 5-15 mm. long, sessile or subsessile, obtuse or acutish at apex, minutely scurfy-scabrous on the margins; flowers mostly 2 or 3 in the axils of most of the leaves; pedicels 2 mm. long, equaling the stipule-sheaths; calyx 2 mm.

long, the lobes oblong, with narrow white or roseate margins; stamens 5-8; achene 3-angled, 2-2.5 mm. long, ovoid-oblong, slightly exceeding the calyx, black, smooth and shining.

Meadows and rocky slopes, Boreal Zones; British Columbia and the Cascade Mountains, Washington, to the southern Sierra Nevada, California, east to Montana and Colorado. Type locality: Wasatch and Uinta Mountains, 9,000-11,000 feet altitude, Utah. July-Sept.

13. *Polygonum sawatchense* Small. Sawatch Knotweed. Fig. 1455.

Polygonum sawatchense Small, Bull. Torrey Club 20: 213. 1893.

Annual with dull green foliage, the stems slender, erect, 5-20 cm. high, simple or commonly branched from near the base, more or less papillose throughout, obscurely 4-angled or winged below the stipules. Leaves obovate to oblanceolate or the uppermost nearly linear, 5-20 mm. long, acute at apex, narrowed to the sessile base, flat or revolute; conspicuously articulate at the junction with the sheath, midrib prominent and often keeled; stipule-sheaths 2-parted, at length lacerate; flowers borne in clusters of 2-3 in the axils of nearly all the leaves from near the base to the top; calyx green, 2-3 mm. long, the lobes oblong, a little paler on the margins; stamens 6-8; style cleft to the base, very short; achene 3-angled, oblong, smooth, black and shiny.

Dry ground, Arid Transition Zone; Klickitat County, Washington, to the eastern slopes of the central Sierra Nevada, California, east to Dakota and Colorado. Type locality: Sawatch Mountains, Colorado. July-Sept.

14. *Polygonum spergulariaeforme* Meisn. Fall or Spurry Knotweed. Fig. 1456.

Polygonum spergulariaeforme Meisn. ex Small, Bull. Torrey Club 19: 366. 1892.

Polygonum coarctatum Dougl. ex Meisn. in DC. Prod. 14: 101. 1856. Not Meisn. 1826.

Annual, erect, slender and wiry, simple or usually rather strictly branched or diffuse, 1-4 dm. high, scurfy throughout. Leaves linear to linear-lanceolate, 0.5-3 cm. long, acute at apex, sessile, often revolute, conspicuously articulate with the stipule-sheaths; flowers 2-4 in the axils, appearing as spicate racemes above by the shortening of the internodes, at length nodding; calyx-lobes roseate to whitish, with a very narrow darker midrib. 2.5-3 mm. long; stamens 8; style 3-cleft to the middle; achene 3-angled, 3-4 mm. long, oblong, black, smooth and shining or somewhat granular at the apex.

Dry sterile soils, mainly Arid Transition Zone; British Columbia to the Sierra Nevada and Humboldt County, California, east to Colorado. Type locality: not designated. June-Sept.

15. *Polygonum Nuttallii* Small. Nuttall's Knotweed. Fig. 1457.

Polygonum intermedium Nutt. ex S. Wats. Proc. Amer. Acad. 17: 378. 1882. Not Ehrh. 1791.

Polygonum Nuttallii Small, Mem. Dept. Bot. Columbia Univ. 1: 132, pl. 53. 1895.

Annual, glabrous or somewhat scurfy, especially at the nodes and on the margins of the leaf, the stems slender and wiry, erect, simple or branched, dark red, 4-angled and often narrowly winged, 5-25 cm. high. Leaves linear-lanceolate to linear-oblanceolate, 1-3 cm. long, acute at both ends, subsessile, glaucescent beneath, slightly revolute-margined; stipule-sheaths 3-4 mm. long, becoming lacerate in age; flowers 2-3 in the upper axils, appearing as terminal bracted racemes, short-pedicelled; calyx 2.5 mm. long, the lobes greenish, with roseate margins; filaments conspicuously dilated at the base; achenes 3-angled, ovoid, 2 mm. long, black, smooth and shiny.

Usually in gravelly or sandy soils, Canadian and Transition Zones; British Columbia south in Olympic and Cascade Mountains to northern Oregon. Type locality: "On bluffs of the Columbia plains." July-Sept.

16. *Polygonum Kelløggii* Greene. Kellogg's Knotweed. Fig. 1458.

Polygonum imbricatum Nutt. ex S. Wats. Amer. Nat. 7: 665. 1873. Not Raf. 1836.

Polygonum Kelloggii Greene, Fl. Fran. 134. 1891.

Polygonum Watsonii Small, Mem. Dept. Bot. Columbia Univ. 1: 138, pl. 56, as to synonymic type. 1895.

Annual, glabrous throughout, the stems erect and simple or divergently branched from the base, 3-8 cm. high, internodes very short. Leaves linear or linear-lanceolate, 5-10 mm. long, crowded on the branches, but spreading and not imbricate; flowers in a leafy-bracted spike 5-30 mm. long; bracts linear to lanceolate, green or with a very narrow white margin, spreading or on older plants those toward the apex appressed-ascending; pedicels less than 1 mm. long; calyx scarcely 2 mm. long, green with a white margin; stamens 3; style wanting or very short; achene 3-angled, 1.5 mm. long, ovoid, light brown, dull and smooth or granular toward the apex.

Gravelly or sandy slopes, Canadian and Hudsonian Zones; Cascade Mountains, Washington, south to the mountains of southern California, east to Colorado. Type locality: "common in the Donner Lake region of the Sierra," California. June-Sept.

Polygonum esotéricum Wheeler, Rhodora 40: 309. 1938. Smooth brown seeds and subsessile stigma-lobes as in *P. Kelloggii*, but anther-bearing stamens 8 or the inner 3 anther-bearing and the 5 outer rudimentary; flowers in the axils of all but the lowest leaves forming a slender elongated bracted spike; bracts lanceolate, narrowly white-margined. Known only from the type collection: dry seasonally submersed adobe bed of artificial lake, Rim Rock Valley Reservoir, Modoc County, California.

17. *Polygonum polygaloides* Meisn. White-margined Knotweed. Fig. 1459.

Polygonum polygaloides Meisn. in DC. Prod. 14: 101. 1856.

Annual, glabrous, the stems erect, 5-20 cm. high, simple or usually corymbosely branched. Leaves narrowly linear, 1-3 cm. long, acute, conspicuously articulate to sheath; floral bracts ascending, crowded and imbricate, forming short axillary and terminal racemes, oblong with conspicuous white-scarious margins; flowers several in each axil; calyx 2 mm. long, the lobes lanceolate, with a dark rose midrib and white or pinkish margins; stamens 8; style 3-parted to below the middle; achene 3-angled, ovoid, 1-1.5 mm. long, dull black and striate.

Moist ground, Arid Transition Zone; Spokane County, Washington, to northeastern Oregon, east to Montana. Type locality: Clearwater River, Idaho. June-July.



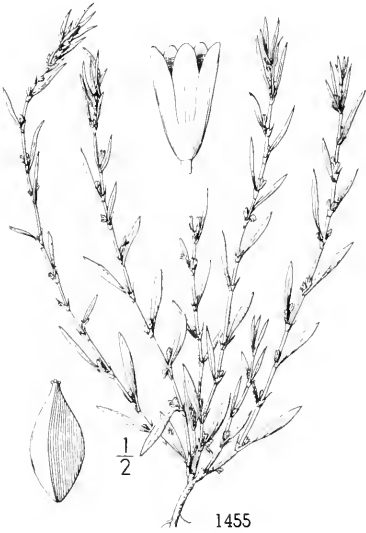
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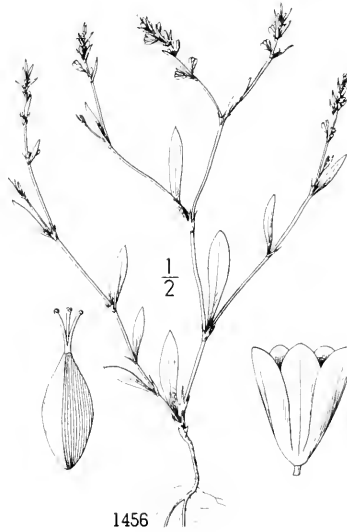
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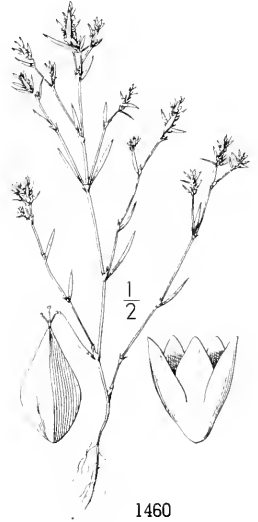
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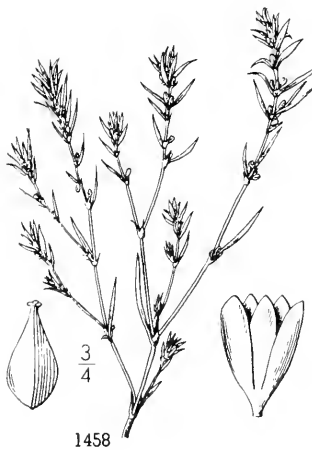
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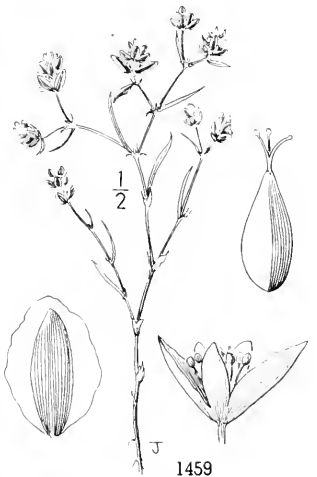
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1452. *Polygonum Douglasii*
1453. *Polygonum Austiniae*
1454. *Polygonum minimum*

1455. *Polygonum sawatchense*
1456. *Polygonum spargulariaeforme*
1457. *Polygonum Nuttallii*

1458. *Polygonum Kelloggii*
1459. *Polygonum polygaloides*
1460. *Polygonum confertiflorum*

18. *Polygonum confertiflorum* Nutt. Dense-flowered Knotweed. Fig. 1460.

Polygonum Watsonii Small, Mem. Dept. Bot. Columbia Univ. 1: 138. *pl.* 56, as to description. 1895.

Polygonum confertiflorum Nutt. ex Piper, Contr. U.S. Nat. Herb. 11: 228. 1906.

Polygonum imbricatum var. *Watsonii* Small ex Jepson, Man. Fl. Pl. Calif. 290. 1925.

Annual, slender, glabrous, or usually scurfy at the nodes, the stems erect, simple or usually branched, 3–15 cm. high. Leaves narrowly linear-lanceolate, 1–3.5 cm. long; flowers in short terminal bracted racemes; floral bracts similar to the leaves but reduced, 5–10 mm. long, crowded and imbricate with a narrow white margin; flowers several to each bract; calyx 2 mm. long, the lobes oblong-ovate, about equal with green midrib and usually pinkish margins; stamens 3–5; style 3-cleft to below the middle; achene 3-angled, narrowly ovoid, prominently striate-granular, dull black.

Moist flats and banks, Arid Transition Zones; Douglas County, eastern Washington, to northern California, east to Colorado; mainly east of the Cascades but occurring west of these in the Willamette Valley and Siskiyou Mountains. Type locality: Columbia Plains. Collected by Nuttall. June–July.

19. *Polygonum Bolanderi* Brewer. Bolander's Knotweed. Fig. 1461.

Polygonum Bolanderi Brewer ex A. Gray, Proc. Amer. Acad. 8: 400. 1872.

Stems much branched from a woody caudex and root, suffrutescent but slender and wiry, erect, 2–6 dm. high. Leaves linear or linear-subulate, 3–15 mm. long, about 1 mm. or less wide, cuspidate, rather obscurely articulate at base, minutely punctate; stipule-sheaths with the upper hyaline portion conspicuously lacerate and on the ultimate branchlets almost concealing the leaves; flowers 1 or 2 in the axils, sessile, forming slender leafy-bracted spikes; calyx white or rose-colored with a greenish midvein; stamens 8; style 3-parted to the base; achene 3-angled, oblong-ovoid, 25 mm. long, chestnut brown, smooth and shining.

Dry gravelly or rocky slopes Sonoran and Arid Transition Zones; North Coast Ranges, Humboldt County to Napa County, also Sierra Nevada in Butte County, California. Type locality: very dry rocky hills east of Napa Valley, California. June–Nov.

20. *Polygonum californicum* Meisn. California Knotweed. Fig. 1462.

Polygonum californicum Meisn. in DC. Prod. 14: 100. 1856.

Polygonum Greenei S. Wats. Proc. Amer. Acad. 14: 295. 1875.

Durania californica Greene, Leaflets Bot. Obs. 1: 23. 1904.

Durania Greenei Greene, loc. cit.

Annual, glabrous, the stems slender and wiry, erect, 7–20 cm. high, branched and flexuous or nearly simple, the branches spreading or ascending. Leaves narrowly linear, 1–3 cm. long, subulate-tipped, 3-nerved, not articulate; stipule-sheaths 3–4 mm. long, conspicuously lacerate into subulate bristles; flowers solitary in each axil, forming in early stages rather open spikes, but late in season compact by shortening of internodes; calyx 2–2.5 mm. long; style 3-parted to the base; achene 3-angled, 2 mm. long, narrowly oblong-ovoid, dark brown, smooth and shining.

Dry hillside often in clay soil, Upper Sonoran Zone; Klickitat County, Washington, and Josephine County, Oregon, and in California North Coast Ranges and Sierra Nevada to San Francisco and Mariposa Counties. Type locality: dry places, Sacramento Valley, California. Collected by Hartweg. May–Oct. *P. Greenei* S. Wats. is the autumnal stage when the internodes become shorter.

21. *Polygonum Parryi* Greene. Parry's Knotweed. Fig. 1463.

Polygonum Parryi Greene, Bull. Torrey Club 8: 99. 1881.

Annual, glabrous, much branched and compact, 2–5 cm. high, or sometimes more loosely branched and up to 10 cm. high, leafy throughout. Leaves narrowly linear, 5–20 mm. long, subulate-tipped, with a marginal nerve on either side paralleling the midrib, not articulate; stipule-sheaths becoming extremely lacerate and concealing the flowers, these solitary in nearly all the axils down to the base, sessile; calyx 1.5 mm. long; stamens 8; style very short, 3-parted to the base; achene 3-angled, oblong-ovoid, 1.5 mm. long, chestnut brown, smooth and shining.

In sandy soil, Arid Transition Zone; Falcon Valley, southern Washington, to the Sierra Nevada and Cuyamaca Mountains, California. Type locality: Yosemite Valley, California. June.

22. *Polygonum Bidwelliae* S. Wats. Bidwell's Knotweed. Fig. 1464.

Polygonum Bidwelliae S. Wats. Proc. Amer. Acad. 14: 294. 1879.

Annual, glabrous, except for inconspicuous scurf at the nodes, the stems erect, 3–12 cm. high, divergently branched, the branches often as long as or longer than the stem. Leaves narrowly linear, 5–20 mm. long, subulate-tipped, 3-nerved, not articulate; stipule-sheaths conspicuous, 2-parted, oblong-ovate, 3–4 mm. long, sharply serrate at the apex, or the lower ones at length somewhat lacerate; flowers solitary in the leaf axils, the upper internodes becoming shortened and forming bracted spikes 1–3 cm. long; calyx roseate, 2 mm. long, completely concealed by the silvery scarious sheaths; stamens 8; style 3-parted to the base, the branches divergent; achenes 3-angled, scarcely 2 mm. long, oblong, dark brown, smooth or minutely granular at the apex and on the angles.

Volcanic outcrops, Upper Sonoran Zone; foothills of the Sierra Nevada, east of Chico, Butte County, California. Type locality: near Chico, California. May–June.

23. *Polygonum viviparum* L. Viviparous Knotweed or Snakeweed. Fig. 1465.

Polygonum viviparum L. Sp. Pl. 360. 1753.

Bistorta vivipara S. F. Gray, Nat. Arr. Brit. Pl. 2: 268. 1821.

Perennial, with corm-like scaly rootstocks and simple slender erect stems, 10–25 cm. high.

Basal leaves long-petioled, oblong to lanceolate, acute at apex, cordate or subcordate at base, 3–20 cm. long; stem leaves linear to narrowly lanceolate, subsessile or clasping, often revolute on the margins; raceme solitary, terminal, narrow, bearing reddish bulblets instead of flowers toward the base; calyx-lobes 5, pale rose or white; stamens exserted; achenes 3-angled, granular and dull.

Meadows, Arctic and Hudsonian Zones; Alaska to Wallowa Mountains, Oregon, Colorado, Labrador and New England; also in Europe and Asia. Type locality: in Europe. June–Aug.

24. *Polygonum bistortoides* Pursh. Western Bistort or Snakeweed. Fig. 1466.

Polygonum bistortoides Pursh, Fl. Amer. Sept. 271. 1814.

Bistorta bistortoides Small, Bull. Torrey Club 33: 57. 1906.

Perennial from a large fleshy horizontal chaffy rootstock, the stems erect, simple, 2.5–7 dm. high. Basal leaves oblong to oblong-lanceolate or oblanceolate, 10–25 cm. long, acute or obtuse at apex, acuminate at base, on petioles about as long as the blades, glabrous and more or less glaucous; stem leaves sessile, mostly lanceolate, 3–15 cm. long, cordate or subcordate at base; stipule-sheaths narrowly cylindric, oblique at apex; raceme solitary, terminal, densely flowered, 1–6 cm. long, 10–15 mm. broad; calyx-lobes 5, pale rose to white, about 4 mm. long; pedicels 3–7 mm. long, articulate at the base of the calyx; stamens exserted; achenes 3-angled, light brown, smooth and shining.

Mountain meadows and streams, Canadian and Hudsonian Zones; Arctic Alaska to southern California, Colorado, and Arizona. Type locality: Weippe, Idaho, according to Piper, Contr. U.S. Nat. Herb. 11: 230. 1906. May–Aug. This is a variable species, and Greene (Pittonia 5: 197–200. 1903) proposed several segregates, of which the following are in the Pacific States: *P. cephalophorum*, *P. vulcanicum*, *P. bernardinum*, and *P. glastifolium*.

25. *Polygonum phytolaccaefolium* Meisn. Alpine Knotweed. Fig. 1467.

Polygonum phytolaccaefolium Meisn. ex Small, Mem. Dept. Bot. Columbia Univ. 1: 35. 1895.

Aconogonum phytolaccaefolium Small ex Rydb. Fl. Rocky Mts. 238, 1061. 1917.

Stout perennial, 1–2 m. high, glabrous or sparsely pubescent, the stems more or less branched, channeled. Leaves broadly lanceolate, 3–15 cm. long, 1–4 cm. broad, acute to acuminate at apex, narrowed at base, coriaceous, short-petioled; panicles ample, leafless or nearly leafless, loosely flowered; pedicels slender, 3 mm. long; calyx-lobes white or greenish white, 3 mm. long, obovate to oblong; styles 0.5 mm. long; achene 3-angled, 4 mm. long, ovoid, acute, smooth and shining.

Subalpine springs and moist slopes, Canadian Zone; Alaska to central California, east to Blue Mountains, Oregon, Idaho, and Nevada. Type locality: California. This has been referred by some American authors to the Old World species *Polygonum alpinum* Allioni or *P. polymorphum* Ledeb. June–Aug.

26. *Polygonum Newberryi* Small. Newberry's Knotweed. Fig. 1468.

Polygonum Newberryi Small, Bull. Torrey Club 21: 170. 1894.

Perennial, the stems simple, usually several from a woody rootstock, decumbent or erect, stout, 10–30 cm. high, often zigzag above, soft-pilose, usually reddish. Leaves mostly broadly ovate, 1.5–4 cm. long, obtuse at apex, usually cordate or subcordate at base, pallid, more or less densely soft-pilose, at least the lower short-petioled; racemes short, few-flowered; calyx-lobes greenish tinged with rose, 5, 2.5–3 mm. long; stamens 8, included; style 3-parted; achene 3-angled, obovoid, light brown, smooth and shining.

Rocky slopes, especially pumice, Boreal Zones; Cascade and Olympic Mountains, Washington, south to the Lava Beds, Modoc County, California. A form with oblong-ovate, glabrous or subglabrous leaves occurs in the vicinity of Mount Stuart, Washington. Type locality: near Crater Lake, Oregon. July–Aug.

Polygonum Newberryi var. *glabrum* G. N. Jones, Rhodora 40: 359. 1938. Plants glabrous throughout, otherwise like the typical species. Olympic and Wenatchee Mountains, Washington.

27. *Polygonum Davisiae* Brewer. Davis' Knotweed. Fig. 1469.

Polygonum Davisiae Brewer ex A. Gray, Proc. Amer. Acad. 8: 399. 1872.

Stems several from a stout woody root, decumbent or erect, somewhat fleshy, 1–4 dm. long, simple or with a few short branches. Leaves ovate-oblong, 10–45 mm. long, acute or acutish at apex, acute or obtuse at base, usually sessile or subsessile, scabrous-pubescent, with stout upwardly appressed hairs, sometimes very sparsely so; flowers in short usually 3–4-flowered racemes; calyx-lobes greenish white, 3 mm. long; stamens 8; style 1 mm. long, 3-parted; achene 3-angled, 4 mm. long, exserted, usually narrowly ovoid.

Alpine and subalpine, gravelly situations, Boreal Zones; Siskiyou Mountains, southern Oregon, to the central Sierra Nevada, California. Type locality: Sierra Nevada, California. June–Sept.

28. *Polygonum natans* (Michx.) Eaton. American Water Persicaria. Fig. 1470.

Polygonum amphibium of Amer. authors, not L.

Polygonum amphibium var. *natans* Michx. Fl. Bor. Amer. 1: 240. 1803.

Polygonum natans Eaton, Man. ed. 3. 400. 1822.

Polygonum Hartwrightii A. Gray, Proc. Amer. Acad. 8: 294. 1870.

Persicaria oregana, *P. purpurata*, *P. insignis*, *P. chelanica* Greene, Leaflets Bot. Obs. 1: 27–49. 1904.

Perennial, aquatic or rooting in mud, rarely branching above the base. Leaves usually floating, 5–10 cm. long, ovate-oblong or elliptic, obtuse or acutish at apex, rounded or sometimes subcordate at base, glabrous and shining above; peduncles glabrous; spike terminal, ovoid or short-cylindric, 15–25 mm. long, densely flowered; calyx-lobes rose-colored, 4–5 mm. long;

stamens 5; style 2-cleft; achene lenticular, oblong-spherical to obovoid, black and shining or slightly granular and dull.

Borders of lakes and ponds, Boreal and Austral Zones; Alaska to southern California, Quebec, and Pennsylvania. Type locality: eastern North America. July–Sept.

29. *Polygonum coccineum* Muhl. Swamp Persicaria, Swamp Knotweed.

Fig. 1471.

Polygonum amphibium var. *emersum* Michx. Fl. Bor. Amer. 1: 240. 1803.

Polygonum coccineum Muhl. ex Willd. Enum. Hort. Ber. 1: 428. 1809.

Polygonum Muhlenbergii S. Wats. Proc. Amer. Acad. 14: 295. 1879.

Polygonum emersum Britton, Trans. N.Y. Acad. 8: 73. 1889.

Stems arising from elongated perennial rootstocks, glabrous or strigose, erect, usually simple, 3–10 dm. high. Leaves 6–18 cm. long, ovate-lanceolate to oblong-lanceolate or the upper narrowly lanceolate, acute or usually acuminate at apex, rounded or cordate at base, short-petioled, glabrous or frequently strigose-pubescent; stipule-sheaths cylindric, not ciliate; racemes 1 or 2, erect, cylindric, 3–10 cm. long; calyx deep rose; stamens and styles exserted; achene lenticular, broadly obovate or orbicular, the sides convex, black and shining.

In ponds and swamps, Transition and Sonoran Zones; British Columbia to southern California, and east to the Atlantic Coast. Type locality: Pennsylvania. *Persicaria alismaefolia*, *P. Covillei*, *P. Cusickii*, *P. franciscana*, *P. hesperia*, *P. pratincola* Greene, Leaflets Bot. Obs. 1: 36–44, 1904, are synonymous. June–Oct.

30. *Polygonum hydropiperoides* Michx. Mild Water Pepper. Fig. 1472.

Polygonum hydropiperoides Michx. Fl. Bor. Amer. 1: 239. 1803.

Polygonum hydropiperoides var. *strigosum* Small, Bull. Torrey Club 19: 355. 1892.

Polygonum hydropiperoides var. *asperifolium* Stanford, Rhodora 28: 27. 1926.

Perennial with glabrous or strigulose stems, 3–10 dm. high. Leaves linear-lanceolate to oblong-lanceolate, 5–15 cm. long, short-petioled, short-ciliate on the margins, and rather sparsely pubescent with appressed hairs on the midrib beneath; stipule-sheath cylindric, rather coarsely strigose and fringed with bristles; racemes in terminal panicles, very slender, and more or less interrupted, 3–8 cm. long; calyx white to rose; stamens 8; styles short, 3-parted to below the middle; achene 3-angled, ovoid or oblong-ovoid, 2 mm long, smooth and shining.

Swamps and edges of pools, Transition and Sonoran Zones; northern California south to Mexico and east to Minnesota, Maine, and Florida. Type locality: Pennsylvania. June–Oct.

31. *Polygonum Hydrópiper* L. Common Smartweed or Water Pepper.

Fig. 1473.

Polygonum Hydrópiper L. Sp. Pl. 361. 1753.

Polygonum Hydrópiper var. *projectum* Stanford, Rhodora 29: 86. 1927.

Annual, the stems erect or assurgent, 2–6 dm. high, simple or branched throughout, glabrous. Leaves ovate-lanceolate to narrowly lanceolate, 2–9 cm. long, acute or acuminate at apex, narrowed at base to a short petiole, ciliate, sparsely strigose on the midrib beneath, papillose and punctate, very acrid; stipule-sheaths cylindric, sparsely and coarsely strigose, and sparsely ciliate with rather stiff bristles; spikes paniculate, slender, nodding; sepals glandular-punctate, greenish with white or pale rose margins; stamens 6; styles 2–3-parted; achene lenticular or 3-angled, minutely striated and dull.

Wet bottom lands and swamps, Transition and Upper Sonoran Zones; Washington and Idaho south to central California, east to the Atlantic States; probably introduced. Type locality: Europe. July–Oct.

32. *Polygonum punctatum* Elliott. Water Smartweed. Fig. 1474.

Polygonum acre H.B.K. Nov. Gen. & Sp. 2: 179. 1817. Not Lam. 1778.

Polygonum punctatum Ell. Bot. S. C. and Ga. 1: 445. 1817.

Perennial, the stems rooting at the decumbent base, erect or ascending, 3–10 dm. high, simple or branched, nearly or quite glabrous. Leaves lanceolate to linear-lanceolate, 5–15 cm. long, acuminate, punctate, ciliate on the margins and often strigose on the midrib; stipule-sheaths strigose or glabrous, conspicuously bristly ciliate; racemes forming a naked or leafy panicle, narrowly linear, 1.5–6 cm. long, loosely flowered or interrupted below; calyx greenish, conspicuously glandular-punctate; stamens 8; style short, 2–3-parted to the base; achene lenticular or 3-angled, 2.5 mm. long, black, smooth and shining.

Moist bottom lands and edges of swamps, Transition and Sonoran Zones; Washington to California across the continent and south to tropical America. Type locality: southern Atlantic States. Aug.–Oct.

Polygonum punctatum var. *leptostachyum* (Meisn.) Small, Bull. Torrey Club 19: 356. 1892. Often flowering as an annual, the stems erect, 3–4 dm. high, slender. Leaves lanceolate, 3–8 cm. long, thinner and paler green; racemes very slender, loosely interrupted below. About the same range as the species and possibly specifically distinct, but interbreeding is evident in some localities.

33. *Polygonum Persicària* L. Lady's Thumb, Spotted Persicaria. Fig. 1475.

Polygonum Persicaria L. Sp. Pl. 361. 1753.

Persicaria Persicaria Small, Fl. S.E. U.S. 378. 1903.

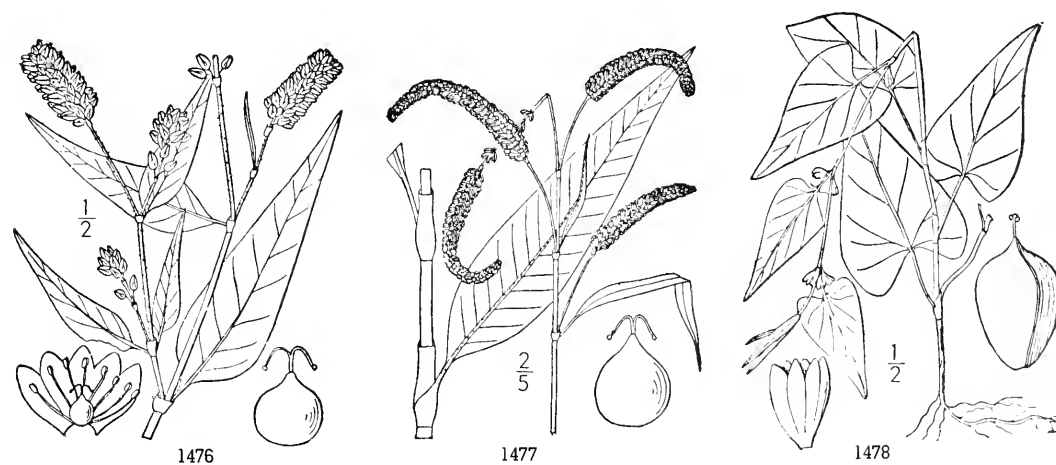
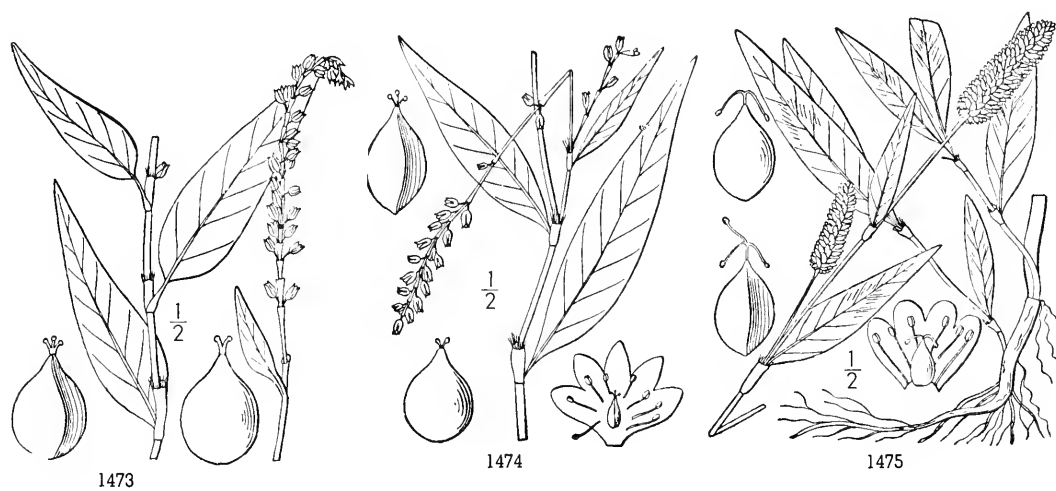
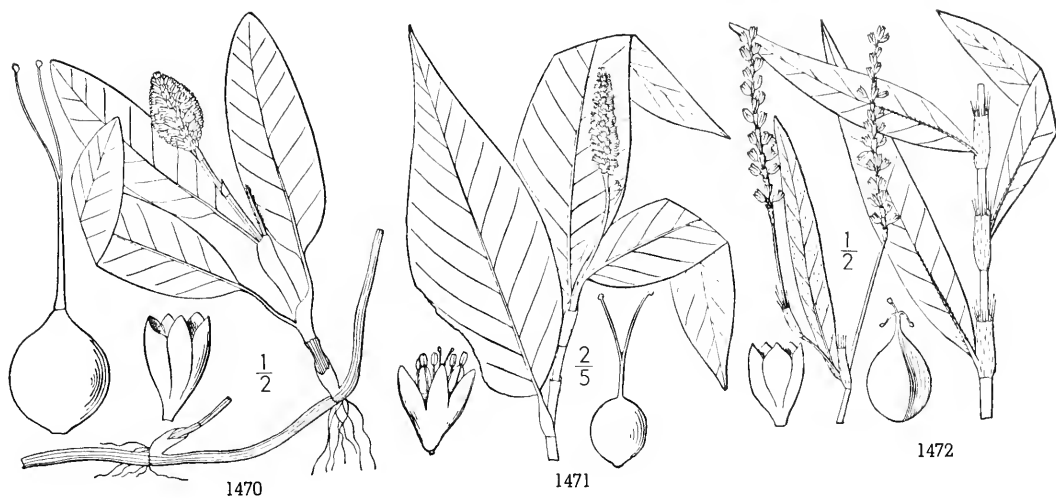
Annual, glabrous or sparingly puberulent, the stems erect, usually branched from the base, 2–6 dm. high. Leaves lanceolate to linear-lanceolate, acuminate at apex, narrowed to the base,



1461. *Polygonum Bolanderi*
1462. *Polygonum californicum*
1463. *Polygonum Parryi*

1464. *Polygonum Bidwelliae*
1465. *Polygonum viviparum*
1466. *Polygonum bistortoides*

1467. *Polygonum phytolaccaefolium*
1468. *Polygonum Newberryi*
1469. *Polygonum Davisiae*



1470. *Polygonum natans*
1471. *Polygonum coccineum*
1472. *Polygonum hydropiperoides*

1473. *Polygonum Hydropiper*
1474. *Polygonum punctatum*
1475. *Polygonum Persicaria*

1476. *Polygonum pennsylvanicum*
1477. *Polygonum lapathifolium*
1478. *Polygonum Convolvulus*

subsessile, punctate, often ciliate on the margins; stipule-sheaths sparsely villous with appressed hairs or glabrate, fringed with short weak bristles; racemes solitary or paniced, erect, 15–25 mm. long, densely flowered; bracts bristly ciliate; stamens 6; style 2–3-parted; achene lenticular or 3-angled, 2–2.5 mm. broad, black, smooth and shining.

Moist places, Transition and Sonoran Zones; Puget Sound, Washington, to southern California east across the continent. Naturalized from Europe. May–Oct.

34. *Polygonum pennsylvanicum* L. Pennsylvania Persicaria. Fig. 1476.

Polygonum pennsylvanicum L. Sp. Pl. 362. 1753.

Persicaria pennsylvanica Small, Fl. S.E. U.S. 377. 1903.

Annual, the stems erect, simple or well branched, glabrous or the uppermost internodes stipitate-glandular. Leaves narrowly to broadly lanceolate, 4–20 cm. long, acuminate, ciliate on the margins, otherwise glabrous or sometimes the uppermost glandular beneath; stipule-sheaths funnellform; racemes paniculate, oblong-cylindric, erect; calyx-lobes rose purple or reddish, 3–4 mm. long; achene flat or the sides somewhat concave, orbicular or slightly broader than long, 3 mm. broad, smooth, shiny black.

Low wet ground, Boreal and Austral Zones; sparingly introduced in the Pacific States, marshes near Kenwood, Sonoma County, California. Type locality: Pennsylvania. July–Sept.

35. *Polygonum lapathifolium* L. Pale Persicaria, Willow Weed. Fig. 1477.

Polygonum lapathifolium L. Sp. Pl. 360. 1753.

Polygonum nodosum Pers. Syn. Pl. 1: 440. 1805.

Persicaria lapathifolia S. F. Gray, Nat. Arr. Brit. Fl. 2: 270. 1821.

Polygonum jusiforme Greene, Erythra 1: 259. 1893.

Annual with simple or much branched erect or ascending stems, usually with prominently swollen nodes. Leaves lanceolate to oblong-lanceolate, 5–20 cm. long, narrowed at base and attenuate at apex, inconspicuously punctate otherwise glabrous or often sparsely scabrous with upwardly appressed hairs on the midrib and margins; stipule-sheaths and bracts sometimes minutely ciliate; peduncles glabrous or often sparsely glandular; racemes somewhat paniced, slender, 1–5 cm. long, often nodding; calyx white or pale rose; stamens 6; achene lenticular with concave faces, ovate, scarcely 2 mm. broad, dark brown or black, shining.

Moist roadsides and waste places, Transition and Sonoran Zones; widely distributed throughout temperate North America, frequent in the Pacific States; also Europe and Asia. A variable species, *P. nodosum* and *P. jusiforme* being robust forms with enlarged nodes and reddish stems. Type locality: in Europe. June–Oct.

Polygonum lapathifolium var. *salicifolium* Silbth. (*P. lapathifolium* var. *incanum* Koch, *P. fallax* Greene.) Stems simple or branched from the base, 2–4 dm. high. Leaves acute or only slightly acuminate, more or less white-tomentose beneath; achenes ovate-orbicular, black and shining. San Francisco Bay region and Monterey, California. Much less common than the typical species in the Pacific States.

36. *Polygonum Convolvulus* L. Black Bindweed. Fig. 1478.

Polygonum Convolvulus L. Sp. Pl. 364. 1753.

Tiniaria Convolvulus Webb & Moq. ex Webb & Berth. Hist. Nat. Canar. 3: 221. 1836–40.

Annual, glabrous, scurfy, the stems branched, twining or trailing, 2–10 dm. long, with elongated internodes. Leaves long-petioled, ovate-sagittate, or the upper lanceolate-sagittate, 2–6 cm. long; stipule-sheaths 3–5 mm. long, oblique, the margins entire; flowers in few-flowered axillary clusters or the upper becoming loosely racemose; calyx-lobes 5, 3.5–4 mm. long; achene 3-angled, black, dull and granular.

Edges of fields and waste places. Naturalized in all three of the Pacific States and across the continent. Native of Europe. May–Sept.

Polygonum cuspidatum Seib. & Zucc. Fl. Japon. Fam. Nat. 2: 84. 1846. (*P. Zuccarinii* Small.) Erect stout perennial, 1–2 m. high, glabrous except for inflorescence. Leaves round-ovate, truncate to obtuse or sometimes subcordate at base, abruptly short-acuminate at apex, 8–15 cm. long; flowers in axillary drooping panicles, white, the outer sepals broadly winged in fruit; achene 3-angled. Native of Japan, cultivated as an ornamental, and sometimes appearing as an escape.

Polygonum sachalinense F. Schmidt ex Maxim. Prim. Fl. Amur. 233. 1859. *SACALINE*. Stout perennial, 2–3 m. high. Leaves oblong-ovate or oblong-oval, 10–30 cm. long, cordate at base, acute or somewhat attenuate at apex, dull green, tomentulose especially on the midvein below; flowers in axillary panicles, greenish or tinged with red; outer sepals broadly winged; achene 3-angled. Native of Japan, and occasionally cultivated in the Pacific States. Apparently well established along the lower Klamath River, California.

Family 36. CHENOPODIACEAE.

GOOSEFOOT FAMILY.

Annual or perennial herbs or shrubs with often mealy, scurfy, or fleshy herbage. Leaves alternate or rarely opposite, sometimes wanting, without stipules. Flowers inconspicuous, perfect or unisexual. Calyx persistent, herbaceous, 2–5-lobed or -parted, rarely reduced to a single sepal, or sometimes wanting in pistillate flowers. Petals none. Stamens distinct, as many as the sepals and opposite them, or fewer; anthers 2-celled, longitudinally dehiscent. Ovary superior, 1-celled, 1-ovuled; styles

1-3. Fruit a utricle, with a thin or coriaceous pericarp. Embryo annular and surrounding the endosperm, or spiral and with the endosperm lateral or wanting.

About 75 genera and 500 species of wide geographic distribution.

Embryo annular, semiannular, or conduplicate, surrounding the endosperm.

Leaves not reduced to scales; stems not jointed.

Leaves opposite; calyx-segments strongly imbricate.

1. *Nitrophila*.

Leaves alternate (sometimes opposite in *Sarcobatus*); calyx-segments slightly or not at all imbricate.

Fruit dehiscent; flowers perfect.

Calyx unchanged in fruit; stamen 1.

2. *Aphanisma*.

Calyx indurate at base in age; stamens 5.

3. *Beta*.

Fruit indehiscent.

Fruit enclosed by the calyx or by bracts.

Flowers perfect or polygamous, all similar.

Fruiting calyx wingless and spineless, its segments sometimes keeled.

Stamens and calyx-segments usually 3-5.

Fruiting calyx herbaceous or fleshy.

4. *Chenopodium*.

Fruiting calyx dry and strongly reticulated; leaves pinnatifid.

5. *Roubieva*.

Stamens and sepals 1.

7. *Monolepis*.

Fruiting calyx winged or armed with spines.

Calyx horizontally winged.

Annuals; leaves flat, toothed.

6. *Cycloloma*.

Woody perennials; leaves linear, terete.

11. *Kochia*.

Calyx-lobes each armed with a hooked spine.

12. *Echinopsilon*.

Flowers monoecious or dioecious, the pistillate enclosed by 2 sepal-like bractlets.

Bractlets compressed; pubescence of inflated hairs or wanting.

8. *Atriplex*.

Bractlets obcompressed; pubescence of branched hairs.

Bractlets carinate, becoming dorsally winged in fruit.

9. *Grayia*.

Bractlets not carinate, densely pilose.

10. *Eurotia*.

Fruit well exerted beyond the 1-3 minute sepals; flowers perfect.

13. *Corispermum*.

Leaves reduced, scale-like; stems jointed; flowers in fleshy spikes or sunken in the joints

Bracts alternate, arranged spirally.

14. *Allenrolfea*.

Bracts opposite.

15. *Salicornia*.

Embryo spirally coiled; endosperm little or none.

Flowers monoecious, not bracteolate, the staminate in ament-like spikes.

16. *Sarcobatus*.

Flowers perfect, bracteolate, never in aments.

Leaves fleshy; fruiting calyx wingless.

17. *Suaeda*.

Leaves very spiny; fruiting calyx with a horizontal wing.

18. *Salsola*.

1. NITRÓPHILA S. Wats. Bot. King Expl. 297. 1871.

Low perennial herbs with horizontal rootstocks and subarticulate branches. Leaves opposite, amplexicaul, entire and fleshy. Flowers perfect, axillary. Sepals 5, rarely 6 or 7, chartaceous, concave and carinate, 1-nerved. Stamens 5, united at base into a narrow disk. Style slender; stigmas 2, subulate; ovule pendulous from an erect funicle. Utricle shorter than the calyx, the pericarp membranaceous. Seed vertical, lenticular; embryo annular; radicle inferior. [Name Greek, *nitron*, carbonate of soda, and *philos*, fond of; these plants growing in alkaline soils.]

A monotypic genus of western North America.

1. *Nitrophila occidentalis* (Moq.) S. Wats. *Nitrophila*. Fig. 1479.

Banalia occidentalis Moq. in DC. Prod. 13²: 279. 1849.

Halimocnemis occidentalis Nutt. ex Moq. in DC. Prod. 13²: 279, as a synonym. 1849.

Glaur acutifolia Heller, *Muhlenbergia* 2: 109. 1906.

Plants glabrous, with decumbent oppositely branched stems, 1-4 dm. long, arising from stout rootstocks. Leaves sessile, 1-2.5 cm. long, the floral shorter, linear, semiterete, pungent at apex; flowers 1-3 in the axils, sessile, or the lateral pedicelled; calyx-lobes broadly oblong, about 2.5 mm. long, stramineous; stamens included; seed 1 mm. broad, smooth and shiny black.

Alkaline soil, mostly Upper Sonoran Zone; eastern Washington to Nevada, southern California, and Mexico. Type locality: Oregon. May-Sept.

2. APHANÍSMÁ Nutt. ex Moq. in DC. Prod. 13²: 54. 1849.

Slender glabrous succulent annual herbs. Leaves alternate, sessile, entire. Flowers perfect, solitary or in clusters of 3-5, axillary. Calyx 3-cleft, rarely 4-5-cleft, the concave segments unchanged in fruit. Stamen 1; filament short. Style short, with 3 short recurved stigmas; ovary depressed. Utricle globose, finely 5-costate, finally circumscissile. Seed horizontal, lenticular, rugulose; embryo imperfectly annular, surrounding the copious endosperm. [Name Greek, meaning inconspicuous.]

A monotypic Californian genus.

1. *Aphanisma blitoides* Nutt. *Aphanisma*. Fig. 1480.

Aphanisma blitoides Nutt. ex Moq. in DC. Prod. 13²: 54. 1849.

Cryptanthus blitoides Nutt. ex Moq. in DC. Prod. 13²: 54, as a synonym. 1849.

Stems branching from the base, ascending or decumbent, 3–7 dm. long. Leaves thin, 6–15 mm. long, the lower oblanceolate to oblong and tapering to a short petiole, the upper ovate, clasping at base, acute at apex; calyx minute, appressed to the base of the fruit; utricle 1.5 mm. broad.

Bluffs along the seacoast, Sonoran Zones; Los Angeles County, California, to northern Lower California and the adjacent islands. Type locality: San Diego. April–May.

3. *BETA* L. Sp. Pl. 222. 1753.

Annual, biennial, or perennial herbs, with fleshy taproots. Leaves alternate, mostly basal and petiolate, entire or sinuate, the cauline few and usually sessile. Flowers perfect, small, bracteate and bibracteolate, in axillary glomerules of 3 or more, or the glomerules in terminal often elongated simple or paniculate spikes. Calyx urceolate, 5-lobed, adherent to the base of the ovary and to the others in the glomerule, closed and indurate in fruit. Stamens 5. Stigmas 2–5, short, united at base. Pericarp united to the calyx below, above fleshy or indurate. Seed horizontal, orbicular or reniform, smooth; embryo annular. [The ancient name.]

A genus of 5 or 6 species, natives of Europe, Asia, and northern Africa. Type species, *Beta vulgaris* L.

1. *Beta vulgaris* L. Common Beet. Fig. 1481.

Beta vulgaris L. Sp. Pl. 222. 1753.

Annual or biennial, 6–12 dm. high, usually glabrous, the stems several, erect or spreading, paniculately branched, green or often red. Leaves ovate or ovate-oblong, obtuse, fleshy; spikes becoming much elongated in fruit and interrupted; calyx-lobes oblong, becoming strongly carinate in fruit.

An escape from cultivation and sometimes established in low moist ground, especially near the coast in central and southern California. Type locality: seacoast of Europe. July–Nov.

4. *CHENOPODIUM* [Tourn.] L. Sp. Pl. 218. 1753.

Annual or perennial herbaceous plants, glabrous, white-mealy or glandular, often strongly scented. Leaves alternate, entire, toothed or pinnatifid. Flowers minute, bractless, perfect, sessile in small spicate or paniculate glomerules. Calyx 5-parted or rarely 4-parted, herbaceous, concave. Stamens mostly 5. Styles usually none; stigmas 2, rarely 3–5. Seed horizontal or vertical, free from or adherent to the pericarp; embryo annular. [Name Greek, meaning goose-foot, from the shape of the leaf.]

About 60 species, or wide geographic distribution, many being cosmopolitan weeds. Type species, *Chenopodium rubrum* L.

Herbage glabrous or more or less mealy, never glandular.

Annuals.

Seed horizontal; mostly introduced weeds.

Pericarp adherent to the seed.

Plants glabrous throughout; leaves entire; stems floriferous nearly throughout.

1. *C. polyspermum*.

Plants more or less mealy, at least the nascent parts (nearly glabrous in *hybridum*); stems usually floriferous only toward the tips of the branches.

Leaves abruptly cordate at base, bright green and nearly glabrous. 2. *C. hybridum*.

Leaves cuneate or rounded at base.

Leaves dark green and lustrous above, sparsely mealy beneath. 3. *C. murale*.

Leaves pale, often densely mealy on both surfaces.

4. *C. album*.

Pericarp free from the seed.

Leaves linear to narrowly oblong; petioles short.

5. *C. leptophyllum*.

Leaves ovate-lanceolate or broader, long-pointed, more or less hastate.

6. *C. Fremontii*.

Seed vertical, or an occasional seed horizontal.

Calyx-lobes not becoming fleshy; some of the seeds horizontal.

Leaves densely white-mealy beneath, green and glabrous or nearly so above.

Calyx-lobes narrowly oblong, concealing only a small portion of the utricle; seed sharp-edged. 7. *C. glaucum*.

Calyx-lobes rounded, almost completely concealing the utricle; seed with obtuse margin.

8. *C. farinosum*.

Leaves green on both surfaces, or the nascent leaves more or less mealy on both surfaces.

9. *C. rubrum*.

Calyx-lobes becoming red and fleshy; seeds all vertical.

10. *C. capitatum*.

Perennial from a stout fleshy root.

11. *C. californicum*.

Herbage more or less glandular-pubescent.

Flowers in glomerules, arranged in capitate clusters or short spikes.

Flower clusters small, capitate, all axillary; calyx-lobes not completely enclosing the fruit.

12. *C. carinatum*.

Flower clusters in short spikes, those on older plants arranged in nearly naked terminal paniculate spikes.

13. *C. ambrosioides*.

Flowers solitary in small cymes, those in older plants forming loose spikes.

14. *C. Botrys*.



1479



1481



1482



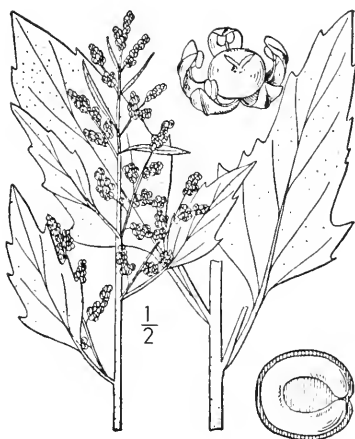
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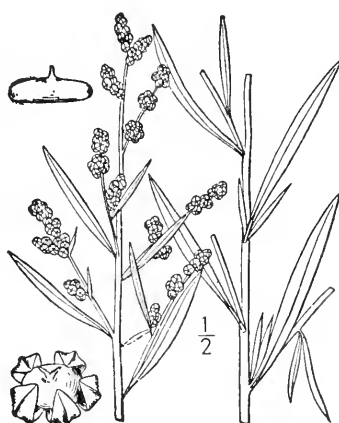
1483



1484



1485



1486



1487

1479. *Nitrophila occidentalis*
1480. *Aphanisma blitoides*
1481. *Beta vulgaris*

1482. *Chenopodium polyspermum*
1483. *Chenopodium hybridum*
1484. *Chenopodium murale*

1485. *Chenopodium album*
1486. *Chenopodium leptophyllum*
1487. *Chenopodium Fremontii*

1. *Chenopodium polyspermum* L. Many-seeded Goosefoot. Fig. 1482.

Chenopodium polyspermum L. Sp. Pl. 220. 1753.

Glabrous annual, with erect or decumbent, commonly much branched stems, 3–9 dm. high. Leaves oblong to ovate, 3–8 cm. long, slender-petioled, entire, obtuse at the apex, rounded to cuneate at base, bright green and rather thin; flowers in dense spikes or loose cymes, arranged in terminal panicles and in the axils of most of the leaves; pericarp firmly adhering to the horizontal seed, about 1 mm. broad, black and shining.

Native of Europe and northern Asia, sparsely adventive in Oregon and the Atlantic States. July–Sept.

2. *Chenopodium hybridum* L. Maple-leaved Goosefoot. Fig. 1483.

Chenopodium hybridum L. Sp. Pl. 219. 1753.

Glabrous, bright green annual, sometimes mealy about the inflorescence; stems erect, usually much branched, 3–14 dm. high. Leaves slender-petioled, rhombic-ovate, 7–20 cm. long, long-acuminate at apex, rounded to subcordate at base, sinuate-angled with 1–4 triangular teeth on each side; flowers in large axillary or terminal panicles; calyx-lobes not keeled, incompletely enclosing the fruit; pericarp adherent; seed horizontal, sharp-edged.

In shaded places; British Columbia and California to Quebec and Virginia; also in the Old World and the Hawaiian Islands. Type locality: "Habitat in Europae cultis." June–Sept.

3. *Chenopodium murale* L. Nettle-leaved or Wall Goosefoot. Fig. 1484.

Chenopodium murale L. Sp. Pl. 219. 1753.

Annual, with glabrous or very sparsely mealy herbage, the stems erect or decumbent, branched, leafy to the summit. Leaves rhombic-ovate, 3–8 cm. long, acute or obtuse at the apex, cuneate or subcordate at base, slender-petioled; flowers in glomerules arranged in loose axillary panicles, shorter than the leaves; calyx-lobes green, obscurely carinate, incompletely enclosing the fruit; pericarp green, adherent; seed horizontal, about 1.5 mm. in diameter, dull, finely punctulate, sharp-edged.

A common garden weed, widely distributed over the Pacific States and over North America generally. Naturalized from Europe. Jan.–Dec.

Chenopodium Vulvária L. Sp. Pl. 220. 1753. Stinking Goosefoot. Ill-scented rather densely mealy annual, with procumbent branches 1.5–4 dm. long. Leaves broadly ovate, entire, 1–3.5 cm. long, on petioles of about the same length; flowers in short dense terminal or axillary spikes; calyx-lobes ovate-lanceolate, obtuse, completely enclosing the fruit; pericarp adherent; seed horizontal, 1 mm. broad, dull black, rounded on the margin. Native of Europe, adventive at Yreka, California.

4. *Chenopodium album* L. Lamb's Quarters, White Goosefoot. Fig. 1485.

Chenopodium album L. Sp. Pl. 219. 1753.

Chenopodium paganum Reichb. Fl. Germ. Excurs. 579. 1830.

Annual, with pale, more or less densely mealy herbage, the stems erect, simple or usually branched, grooved and angled, 0.5–2 m. high. Leaves rhombic-ovate, or the upper lanceolate, cuneate at base, obtuse or acute at the apex, dentate, sinuate-lobed or entire, pale green, more or less densely mealy at least beneath; petioles slender, often as long as the blades; spikes terminal and axillary in the upper axils, often paniculate; calyx-lobes carinate, usually completely enclosing the fruit; pericarp adherent; seed horizontal, black and shining, 1.3 mm. broad; embryo a complete ring.

Fields, gardens, and waste places; frequent in the Pacific States and widely distributed over North America, except in the arctic regions. Native of Eurasia. June–Nov.

Chenopodium album var. *viride* (L.) Moq. in DC. Prod. 13²: 71. 1849. Herbage less pale and scarcely or not at all mealy. Less common than the species in the Pacific States.

Chenopodium Berlandieri Moq. Enum. Chenop. 23. 1840. Aellen (Rep. Spec. Nov. 26: 50–63. 1929) considers this species distinct from *C. album* and recognizes 34 subspecies, varieties, and forms in North America. All seem to us to be minor variants of *C. album*.

5. *Chenopodium leptophyllum* Nutt. Narrow-leaved Goosefoot. Fig. 1486.

Chenopodium album var. *leptophyllum* Moq. in DC. Prod. 13²: 71. 1849.

Chenopodium leptophyllum Nutt. ex Moq. loc. cit., as a synonym; S. Wats. Proc. Amer. Acad. 9: 94. 1874.

Botrys leptophylla Nieuwl. Amer. Midl. Nat. 3: 275. 1914.

Annual, with densely white-mealy herbage or becoming glabrate, the stems simple or branched, erect, 2–6 dm. high. Leaves linear to linear-lanceolate, entire, 15–45 mm. long, acute to rounded at the apex, cuneate or narrower at base; petioles short; flowers in dense glomerules, arranged in dense or slender paniculate spikes; calyx-lobes carinate, completely enclosing the fruit; pericarp free and readily separable; seed horizontal, 1 mm. broad, black and shining, the margin obtuse.

Dry fields, plains, and hillsides, Upper and Lower Sonoran Zones; in the Pacific States extending from eastern Washington to the desert regions of California, and sparingly in the coastal region of southern California. Native of western United States and northern Mexico, and adventive in the Eastern States and Europe. Type locality: California. April–Sept.

Chenopodium subglabrum (S. Wats.) A. Nels. Bot. Gaz. 34: 362. 1902. (*Chenopodium leptophyllum* var. *subglabrum* S. Wats. Proc. Amer. Acad. 9: 95. 1874.) This is probably best considered as a variety of *leptophyllum* as originally described by Watson. It is distinguished by its glabrate herbage and larger seeds, which are 1.5 mm. broad. It is more common than typical *leptophyllum* in eastern Washington and Oregon, and extends to Montana and Nebraska.

6. *Chenopodium Fremontii* S. Wats. Fremont's Goosefoot. Fig. 1487.*Chenopodium Fremontii* S. Wats. Bot. King Expl. 287. 1871.*Botrys Fremontii* Lunell, Amer. Midl. Nat. 4: 305. 1916.

Annual with pale green and more or less mealy herbage especially on the lower leaf-surfaces, the upper surfaces and the stems often glabrous; stems erect, simple below, branched above, slender, 3-8 dm. high. Leaves broadly triangular and usually hastate, 15-40 mm. long, obtuse at the apex, truncate or somewhat cuneate at base, usually with rounded or acutish basal lobes, those of the inflorescence smaller and entire; petioles slender, often nearly as long as the blade; flower glomerules small, arranged in slender often interrupted paniculate spikes; calyx-lobes completely enclosing the fruit; pericarp free; seed horizontal, 1 mm. broad, the margin obtuse.

Dry slopes and flats, mainly Arid Transition Zone; central British Columbia, eastern Washington, and Oregon, south through western Nevada to the San Bernardino Mountains, California, and eastward to North Dakota, Texas, and northern Mexico. Type locality: on the North Platte River, Wyoming. June-Nov.

7. *Chenopodium glaucum* L. Oak-leaved Goosefoot. Fig. 1488.*Chenopodium glaucum* L. Sp. Pl. 220. 1753.*Blitum glaucum* Koch, Syn. Fl. Germ. 608. 1837.

Annual, succulent and glabrous, or nearly so, except the densely white-mealy undersurfaces of the leaves; stems freely branching, decumbent or prostrate, 4-20 cm. long. Leaves usually oblong, varying from lanceolate to narrowly ovate, 2-5 cm. long, sinuate-dentate, or the uppermost sometimes entire, narrowed at base to a short petiole; flowers in short axillary often branched spikes; calyx-lobes narrowly oblong, thin, not keeled, concealing only a small portion of the fruit; utricle dark brown; pericarp free; seed vertical in the lateral flowers, often horizontal in the terminal, sharp-edged, 0.6 mm. broad.

Moist sandy soils, Humid Transition Zone; banks of the Columbia River near Bingen, Washington, to the vicinity of Portland. Naturalized from Europe. July-Oct.

8. *Chenopodium farinosum* (S. Wats.) Standley. Coast Goosefoot. Fig. 1489.*Chenopodium murale* var. *farinosum* S. Wats. Proc. Amer. Acad. 9: 97. 1874.*Chenopodium farinosum* Standley, N. Amer. Fl. 21: 28. 1916.*Chenopodium macrospermum* subsp. *halophilum* f. *farinosum* Aellen, Rep. Spec. Nov. 26: 43. 1929.

Annual, much branched from the base, the branches stout, succulent, erect or ascending, 1-4 dm. long, glabrous. Leaves rhombic to narrowly deltoid-rhombic, 2-5 cm. long, obtuse at the apex, cuneate or rounded at base, irregularly sinuate-dentate or repand-dentate, 3-nerved from the base, succulent, glabrous or nearly so above, densely farinose beneath, becoming glabrate in age; glomerules in dense spikes, arranged in the axils of the upper leaves forming dense leafy panicles; calyx-lobes rounded, not carinate, nearly enclosing the utricle; seed vertical, dark reddish brown, 1 mm. long, the margin obtuse.

Moist ground near the coast, Upper Sonoran Zone; San Francisco to Los Angeles County, California. Type locality: San Francisco. July-Oct.

It is possible but hardly likely that this species, as proposed by Aellen, is to be considered conspecific with the South American *C. macrospermum* Hook. f. which was originally described from plants collected on the Falkland Islands.

9. *Chenopodium rubrum* L. Red Goosefoot. Fig. 1490.*Chenopodium rubrum* L. Sp. Pl. 218. 1753.*Blitum rubrum* Reichb. Fl. Germ. Excurs. 582. 1832.*Botrys rubra* Lunell, Amer. Midl. Nat. 4: 306. 1916.

Glabrous more or less succulent annual, the stems erect, simple or more or less branched, often reddish. Leaves rhombic-ovate to rhombic-lanceolate, 2.5-15 cm. long, coarsely sinuate-dentate, often hastate; petioles slender, equaling or shorter than the blades; glomerules in dense spikes, sessile in the axils of the reduced and often entire upper leaves; calyx-lobes 3 or 5, reddish, not carinate, broadly obovate or ovate; utricle slightly exceeding the calyx-lobes, green; seeds vertical, or a few sometimes horizontal in the same inflorescence, strongly compressed, brown, 0.8-1 mm. long.

Moist saline soils, Transition and Boreal Zones; British Columbia to northern California, and eastward across the continent; also in Europe and Asia. July-Oct.

Chenopodium humile Hook. Fl. Amer. 2: 127. 1838. (*C. rubrum* var. *humile* S. Wats.) Branched from the base, with prostrate or ascending branches 1-2 dm. high. Leaves mostly hastate-lobed, otherwise entire to sinuate-dentate; glomerules solitary in the leaf axils or subspicate above; seeds 0.5-0.6 mm. broad. Closely related to *C. rubrum* and possibly belonging to the same specific complex. British Columbia to northern California, Manitoba, and Colorado; also on the coast of Maine and in Europe.

10. *Chenopodium capitatum* (L.) Aschers. Strawberry Blite. Fig. 1491.*Blitum capitatum* L. Sp. Pl. 2. 1753.*Chenopodium capitatum* Aschers. Fl. Brand. 572. 1864.

Bright green glabrous annual, the stems erect with ascending branches, 2-6 dm. high. Lower leaves triangular, 4-10 cm. long, usually hastate, and more or less irregularly sinuate-dentate, their petioles slender and usually exceeding the blades; upper leaves reduced, narrower, shorter-

petioled and often entire; flowers in dense capitate clusters in the axils of all but the lower leaves, the uppermost clusters with the bract-like leaves much reduced or wanting, forming an interrupted spike; calyx-lobes fleshy, tinged with red, oblong; utricle only partly covered by the calyx, reddish brown; seed erect, 0.8 mm. long, the margin acute.

Moist ground, mainly in the Boreal Zones; southern Alaska to the northern Sierra Nevada, California, and east across the continent; also in Eurasia. Type locality: Tyrol, Austria. June–Aug.

Chenopodium virgatum (L.) Jessen, Deuts. Exc.-Fl. 300. 1879. This is probably only a form of the preceding species, from which it differs mainly in having the inflorescence leafy-bracted to the summit, and the seeds with rounded margins. With the general range of the species, but less common.

11. *Chenopodium californicum* S. Wats. California Goosefoot, Soap Plant.

Fig. 1492.

Chenopodium anthelminticum var. *hastatum* Moq. in DC. Prod. 13²: 74. 1849.

Blitum californicum S. Wats. Proc. Amer. Acad. 9: 101. 1874.

Chenopodium californicum S. Wats. Bot. Calif. 2: 48. 1880.

Perennial from a stout elongated fleshy root, sparsely farinose on the younger parts, glabrate in age and bright green, stems several from each root, decumbent to nearly erect, stout, 2–8 dm. long. Leaves deltoid, 4–10 cm. long and nearly as wide, hastate and coarsely dentate or sinuate-dentate, the upper much reduced; petioles slender, those of the lower leaves equaling or exceeding the leaves, the upper very short; glomerules small, arranged in dense or somewhat interrupted terminal almost leafless spikes, 9–18 cm. long; calyx cleft to about the middle, the lobes oblong-ovate, green, not carinate, shorter than the utricle; pericarp adherent; seed vertical, 2 mm. broad.

Plains and hillsides, Upper Sonoran Zone; central and southern California. Type locality: California. March–June.

12. *Chenopodium carinatum* R. Br. Tasmanian Goosefoot. Fig. 1493.

Chenopodium carinatum R. Br. Prod. 407. 1810.

Salsola carinata Spreng. Syst. 1: 923. 1825.

Ambrina carinata Moq. Chenop. Enum. 41. 1840.

Blitum carinatum Moq. in DC. Prod. 13²: 81. 1849.

Annual, glandular-villous throughout, the stems branching from the base, rather slender, prostrate or decumbent, 2–4 dm. long. Leaves oblong to ovate-oblong, 1–3 cm. long, sinuate-dentate, narrowed at base; petioles slender, about as long as the leaves, the uppermost much reduced; flowers in small axillary clusters; calyx-lobes oblong, lanceolate, partly enclosing the utricle, acute, covered with sessile yellowish glands, usually carinate; utricle dark brown, 1 mm. long; seed vertical, the margin obtuse.

Sandy soils, fields, and gardens; naturalized in the Pacific States, and widely spread from southern Oregon to southern California. Native of Australia and Tasmania. June–Sept.

13. *Chenopodium ambrosioides* L. Mexican Tea. Fig. 1494.

Chenopodium ambrosioides L. Sp. Pl. 219. 1753.

Botrys ambrosioides Nieuwl. Amer. Midl. Nat. 3: 275. 1914.

Annual or short-lived perennial from a fleshy root, more or less glandular-pubescent throughout and strong-scented, the stems erect, 5–10 dm. high, much branched, the lower branches often spreading or decumbent. Leaves 3–8 cm. long, rhombic-ovate to oblong-lanceolate, repand-dentate, undulate, or the upper reduced ones entire, narrowed to the usually short petioles; flowers in glomerules, arranged in short dense or interrupted spikes, these in age forming an elongated slender compound spike, naked or nearly so; calyx-lobes ovate, covering the utricle; pericarp very thin, deciduous; seed vertical or horizontal, subglobose, 0.6 mm. broad, dark brown.

Fields and waste places, especially in low moist ground; throughout the Pacific States, but most abundant in southern California, widely distributed over the continent. Native of tropical America. June–Dec.

Chenopodium ambrosioides var. *anthelminticum* (L.) A. Gray, Man. ed. 2: 364. 1856. Plants mostly spreading or decumbent; leaves more pronouncedly toothed, often subpinnatifid; inflorescence of many ascending, very slender, elongated, paniculate spikes, appearing leafless, the bracts being much reduced; seeds 0.9 mm. broad. About the same range as the species, but especially prevalent in the Sacramento Valley, California.

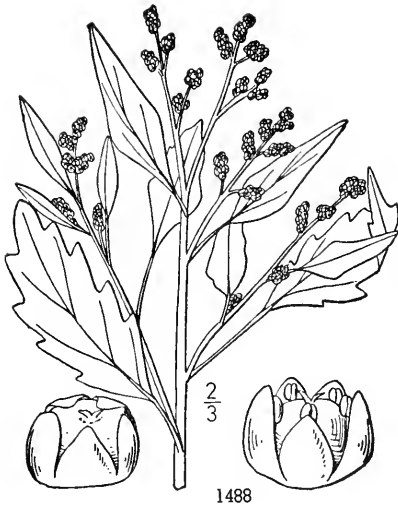
14. *Chenopodium Botrys* L. Jerusalem Oak, Feather Geranium. Fig. 1495.

Chenopodium Botrys L. Sp. Pl. 219. 1753.

Botrys aromatica Nieuwl. Amer. Midl. Nat. 3: 275. 1914.

Annual, the herbage densely glandular-viscid throughout and fragrant, the stems erect, 2–6 dm. high, much branched, the branches ascending. Leaves oblong to oval, 1–5 cm. long, sinuate-pinnatifid, with rounded lobes, the uppermost reduced and entire, narrowed at base to petioles shorter than the blades; flowers in numerous many-flowered cymes, arranged in terminal, elongated, narrow, nearly leafless panicles; calyx-lobes ovate-lanceolate, enclosing the utricle; pericarp adherent, very thin and whitish; seed vertical or horizontal, subglobose, 0.6 mm. broad, dull dark brown.

Usually in sandy soils, Upper Sonoran and Transition Zones; widely spread over the Pacific States and extending across the continent. Native of Eurasia. June–Oct.



1488



1489



1490



1491



1492



1494



1493



1495



1496

1488. *Chenopodium glaucum*
1489. *Chenopodium farinosum*
1490. *Chenopodium rubrum*

1491. *Chenopodium capitatum*
1492. *Chenopodium californicum*
1493. *Chenopodium carinatum*

1494. *Chenopodium ambrosioides*
1495. *Chenopodium Botrys*
1496. *Roubieva multifida*

5. **ROUBIÈVA** Moq. Ann. Sci. Nat. II. 1: 292. 1834.

Perennial strong-scented herbs, with narrow, pinnatifid leaves. Flowers minute, solitary or in small axillary clusters. Calyx-tube turbinate, becoming narrowed at the throat, ovoid and strongly reticulate in fruit, 3-5-toothed. Stamens 5, exserted. Styles 3, elongated. Pericarp thin, glandular, adherent; seed vertical; embryo forming a complete ring. [Name in honor of G. J. Roubieu, French botanist.]

A monotypic genus of South America. Closely related to *Chenopodium*.

1. **Roubieva multifida** (L.) Moq. Cut-leaved Goosefoot. Fig. 1496.

Chenopodium multifidum L. Sp. Pl. 220. 1753.

Roubieva multifida Moq. Ann. Sci. Nat. II. 1: 293. pl. 10. 1834.

Stems branching from the base, prostrate or ascending, 2-10 dm. long, leafy and floriferous throughout, glandular-pubescent. Leaves linear-oblong to lanceolate in outline, pinnatifid, the lobes linear-oblong, entire or toothed, the lower leaves short-petioled, the upper sessile; flowers perfect and pistillate on the same plant; fruiting calyx 2 mm. long, strongly reticulate.

Waste places and ballast, mostly along the coast. Portland, Oregon, to southern California; abundant at San Francisco. Native of Chile. Aug.-Nov.

6. **CYCLOLÔMA** Moq. Chenop. Enum. 17. 1840.

Annual herbs, with alternate petioled leaves. Flowers small, perfect or pistillate, bractless, sessile, solitary or clustered. Calyx 5-lobed, the lobes inflexed, strongly carinate, the tube at length appendaged with a continuous horizontal scarious wing. Stamens 5. Styles 3, short, free or united. Utricle depressed-globose; pericarp membranaceous, free from the seed; embryo annular. [Name Greek, meaning circle and border, in reference to the calyx wing.]

A monotypic North American genus.

1. **Cycloloma atriplicifolium** (Spreng.) Coult. Winged Pigweed. Fig. 1497.

Salsola atriplicifolia Spreng. Bot. Gard. Hal. Nachtr. 1: 35. 1801.

Kochia atriplicifolia Roth, Neue Beitr. 1: 177. 1802.

Salsola platyphylla Michx. Fl. Bor. Amer. 1: 174. 1803.

Cycloloma atriplicifolium Coult. Mem. Torrey Club 5: 143. 1894.

Diffusely branched, 1.5-5 dm. high and usually as broad, tomentose when young, becoming glabrate, the branches slender, angled. Leaves deciduous in age, 2-8 cm. long, oblong in outline, sinuate-toothed, the teeth mucronate; inflorescence paniculately much branched; calyx 3-4 mm. broad, often becoming purple in age.

Sandy soil, mainly Sonoran Zones; Manitoba to Indiana, south to Texas and Arizona; adventive in southern California. Type locality: North America. June-Sept.

7. **MONÓLEPIS** Schrad. Ind. Sem. Hort. Goetting. 1830: 4. 1830;

Linnaea 6: Lit.-Ber. 73. 1831.

Low branching annual herbs, with often succulent farinose or glabrous herbage. Leaves alternate, sessile or petioled, entire, lobed or toothed. Flowers polygamous or perfect, in small axillary clusters. Calyx of one persistent herbaceous sepal, unchanged in fruit. Stamen 1 or wanting. Styles 2, slender. Utricle flat, the pericarp adherent to the vertical seed; embryo nearly a complete ring. [Name Greek, meaning one and scale, in reference to the solitary sepal.]

Three species, natives of western North America. Type species, *Chenopodium trifidum* Trev.

Stems not dichotomously branched, more or less fleshy.

Pericarp pitted; leaves hastate.

Pericarp papillose; leaves entire.

Stems dichotomously branched, very slender; pericarp tuberculate.

1. *M. Nuttalliana*.

2. *M. spathulata*.

3. *M. pusilla*.

1. **Monolepis Nuttalliana** (Schult.) Greene. Nuttall's Monolepis.

Fig. 1498.

Blitum chenopodioides Nutt. Gen. 1: 4. 1818. Not Lam. 1783.

Blitum Nuttallianum Schult. in Roem. & Sch. Syst. Veg. Mant. 1: 65. 1822.

Chenopodium trifidum Trev. Ind. Sem. Vratisl. 1829.

Monolepis Nuttalliana Greene, Fl. Fran. 168. 1891.

Herbage mealy when young, becoming glabrous or nearly so, stems stout, succulent, with many ascending branches. Leaves lanceolate, short-petioled or the upper sessile, 1-6 cm. long, narrowed at base, hastately lobed, the terminal lobe linear or linear-oblong, entire or remotely toothed; flower clusters sessile; sepal oblanceolate or spatulate; pericarp minutely pitted, 1 mm. broad.

Dry or alkaline soils, mainly Sonoran Zones; Alberta and Manitoba to Texas, Sonora, and southern California, also in Siberia and Patagonia. Type locality: arid soils near the banks of the Missouri River. March-Sept. Patata.

2. *Monolepis spathulata* A. Gray. Club-leaved Monolepis. Fig. 1499.*Monolepis spathulata* A. Gray, Proc. Amer. Acad. 7: 389. 1868.

Plants much branched from the base, the branches simple, decumbent or ascending, 3–15 cm. long, glabrous or the young parts mealy. Leaves narrowly spatulate, 5–15 mm. long, entire, fleshy; flower clusters sessile, many-flowered; sepal spatulate, obtuse; pericarp papillose, free from the seed; seed 0.4 mm. broad.

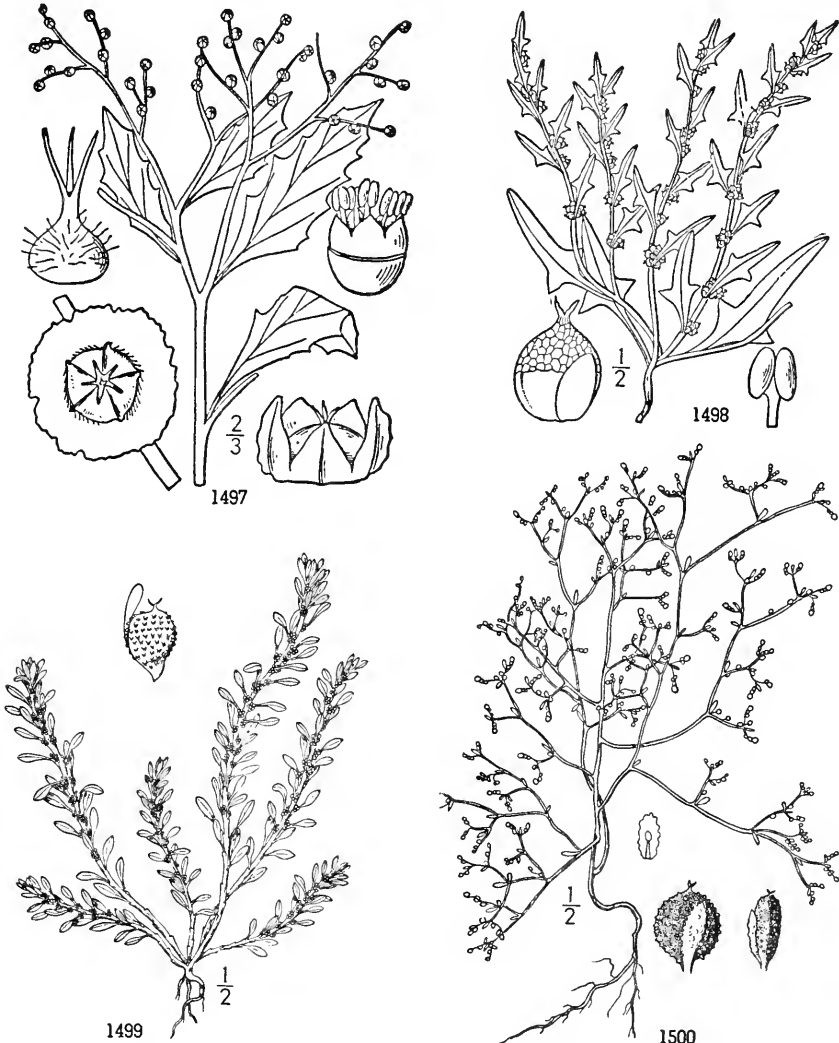
Alkaline soils, Transition Zone; Idaho and eastern Oregon to the Sierra Nevada and San Bernardino Mountains, California; also northern Lower California. Type locality: Mono Pass, Sierra Nevada, California. June–Sept.

3. *Monolepis pusilla* Torr. Dwarf Monolepis. Fig. 1500.*Monolepis pusilla* Torr. ex S. Wats. Bot. King Expl. 289. 1871.

Plants dichotomously much branched, the branches very slender, spreading, 4–20 cm. high, mealy when young, becoming glabrous. Leaves oblong, entire, 4–12 mm. long, short-petioled; flower clusters sessile, 1–5-flowered; sepals obtuse; pericarp tuberculate, adherent to the seed; seed 0.5 mm. broad.

Alkaline soils, Transition and Upper Sonoran Zones; eastern Washington and Wyoming to Colorado and California. Type locality: alkaline valleys of western Nevada. May–July.

Spinacia oleracea L. Sp. Pl. 1027. 1753. Spinach. Annual glabrous herbs. Leaves large, ovate-triangular or hastate, entire or irregularly toothed; flowers dioecious or rarely perfect; staminate flowers with 4–5-parted perianth; pistillate without perianth, subtended by 2 united bracts. Spinach is extensively cultivated in the Pacific States, and quite often is established as an escape, especially in low slightly saline soils.



1497. *Cycloloma atriplicifolium*
1498. *Monolepis Nuttalliana*

1499. *Monolepis spathulata*
1500. *Monolepis pusilla*

8. *ÁTRIPLEX* L. Sp. Pl. 1052. 1753.

Herbs or shrubs, often scurfy, farinose or canescent with inflated hairs. Leaves alternate or opposite, sessile or petioled. Flowers small, green, dioecious or monoecious, in axillary glomerules or paniced spikes, the staminate and pistillate in the same or separate glomerules. Staminate flowers without bracts; calyx 3-5-parted; stamens 3-5. Pistillate flowers 2-bracteolate, the bracts free or often united at least at base, accrescent and enclosing the fruit; perianth none; stigmas 2. Utricle with a membranous pericarp usually free from the seed, seed erect or inverted, rarely horizontal; embryo annular, surrounding the scanty endosperm. [The ancient Latin name.]

About 140 species, of wide geographic distribution. Type species, *Atriplex hortensis* L.

Flowers monoecious; annuals or herbaceous perennials (a few species suffrutescent at base).

Annuals (except *A. Coulteri* and *A. Davidsonii*).

Radicle of the embryo pointing downward (inferior).

Pistillate flowers of 2 kinds, some with 3-5-lobed calyx and bractless, others without calyx but 2-bracted. I. HORTENSES.

Pistillate flowers all alike, enclosed in 2 bracts.

Leaves entire or only the lowest dentate; usually green and glabrous or only sparsely furfuraceous. II. HASTATAE.

Leaves usually all toothed and densely furfuraceous. III. ROSEAE.

Radicle pointing upward.

Plants glabrous or nearly so, fleshy.

IV. PHYLLOSTEGIAE.

Plants furfuraceous, usually densely so.

Fruiting bracts not orbicular.

Bracts broadest at or near the middle, usually rounded or truncate at the apex.

Leaves deltoid.

Bracts toothed only at the truncate apex, 2-3 mm. long.

V. TRUNCATAE.

Bracts toothed well below the middle, often to the base, 3-8 mm. long.

VI. ARGENTAE.

Leaves never deltoid, usually broadest at or above the middle.

VII. ARENARIAE.

Bracts broadest near the base, ovate or hastate, acute at the apex.

VIII. PUSILLAE.

Fruiting bracts orbicular, toothed all around, small.

IX. ELEGANTES.

Perennials, the stems entirely herbaceous or suffrutescent.

Bracts distinct, entire; stems herbaceous, from a fleshy root.

X. CALIFORNICAE.

Bracts united at least at the base.

Fruiting bracts fleshy, reddish.

XI. SEMIBACCATAE.

Fruiting bracts not fleshy, appendaged on the sides.

XII. LEUCOPHYLLAE.

Flowers dioecious, or occasionally a few pistillate flowers occur on a staminate plant.

Leaves all or mainly all opposite; prostrate perennial herbs.

XIII. WATSONIAE.

Leaves alternate or the lowest opposite; shrubs or undershrubs.

Bracts not longitudinally 4-winged.

XIV. HYMENELYTRAE.

Leaves dentate; bracts entire.

Leaves entire or merely undulate.

Plants tall shrubs, seldom less than 1 m. high.

Fruiting bracts orbicular or nearly so, 4 mm. or less in length.

Bracts deeply lacinate-dentate; leaves narrow.

XV. POLYCARPAE.

Bracts entire, shallowly crenate or sinuate-dentate.

XVI. LENTIFORMES.

Fruiting bracts much longer than broad, 5 mm. or more in length.

XVII. CONFERTIFOLIAE.

Plants low, usually less than 6 dm. high, woody only toward the base.

XVIII. NUTTALLIANAE.

Bracts conspicuously longitudinally 4-winged.

XIX. CANESCENTES.

I. HORTENSES.

Represented by a single species.

1. *A. hortensis*.

II. HASTATAE.

Fruiting bracts entire, their sides essentially smooth; plants finely farinose.

Leaves oblong to oblong-lanceolate; bracts 4-12 mm. long; plants mostly decumbent.

Leaves deltoid to rhombic-ovate; bracts 3 mm. long; plants erect.

2. *A. Gmelinii*.

Fruiting bracts toothed on the margins, their sides more or less tuberculate; plants bright green and little or not at all farinose.

3. *A. joaquiniana*.

Lower leaves rhombic-lanceolate to oblong; bracts cuneate or slightly rounded at base.

4. *A. patula*.

Lower leaves triangular-hastate or deltoid; bracts truncate or broadly rounded at base.

5. *A. hastata*.

III. ROSEAE.

Represented by the single species.

6. *A. rosea*.

IV. PHYLLOSTEGIAE.

Represented by one species.

7. *A. Phyllostegia*.

V. TRUNCATAE.

Represented by the single species.

8. *A. truncata*.

VI. ARGENTAE.

Leaves narrowly ovate to oblong, narrowed at the base, 3–10 mm. wide.

9. *A. coronata*.

Leaves deltoid to ovate, broad and often subhastate at base.

10. *A. argentea*.

Upper leaves short-petioled, the lowest opposite.

11. *A. expansa mohavensis*.

Upper leaves strictly sessile, the lowest alternate.

VII. ARENARIAE.

Leaves dentate.

Staminate flowers in elongated usually paniculate spikes.

12. *A. Serenana*.

Staminate flowers in capitate clusters in the upper axils or in simple interrupted terminal spikes.

13. *A. Davidsonii*.

Leaves all entire.

Staminate flowers all axillary.

14. *A. pacifica*.

Staminate flowers chiefly in terminal spikes.

15. *A. Coulteri*.

VIII. PUSILLAE.

Plants simple or virgately branching and strictly erect.

Leaves cordate at base; bracts 4–5 mm. long.

16. *A. cordulata*.

Leaves rounded at base; bracts 2.5–3.5 mm. long.

17. *A. tularensis*.

Plants widely branching from the base, low and rounded.

Branches scurfy-villous; bracts 2.5–3 mm. long, acute.

18. *A. Parishii*.

Branches merely scurfy; bracts 1–1.5 mm. long.

19. *A. pusilla*.

IX. ELEGANTES.

Represented in the Pacific States by a single species.

20. *A. fasciculata*.

X. CALIFORNICAE.

Represented by only one species.

21. *A. californica*.

XI. SEMIBACCATAE.

Represented by the single introduced species.

22. *A. semibaccata*.

XII. LEUCOPHYLLAE.

Plants prostrate or decumbent; leaves obtuse or rounded at apex.

23. *A. leucophylla*.

Plants erect; leaves acute.

24. *A. fruticulosa*.

XIII. WATSONIAE.

Represented by only one species in the Pacific States.

25. *A. Watsonii*.

XIV. HYMENELYTRAE.

Represented by a single species.

26. *A. hymenelytra*.

XV. POLYCARPAE.

Represented by a single species.

27. *A. polycarpa*.

XVI. LENTIFORMES.

Branches conspicuously and sharply angled, spinose; fruiting bracts obscurely denticulate.

28. *A. Torreya*.

Branches terete or nearly so, not spinose, or only slightly so in *A. lentiginosus*.

Leaves rounded or cuneate at base; tall shrubs, 10–25 dm. high.

Bracts entire, convex.

29. *A. Breweri*.

Bracts crenulate, strongly compressed.

30. *A. lentiformis*.

Leaves cordate or subcordate and clasping at base; bracts entire; low shrub, 2–4 dm. high.

31. *A. Parryi*.

XVII. CONFERTIFOLIAE.

Leaves broadly ovate or oval, never hastate; body of the bracts small, not constricted beneath the free terminal wings.

32. *A. confertifolia*.

Leaves elongate-deltoid and usually somewhat hastate; body of the fruit relatively large and distinctly constricted beneath the terminal wings.

33. *A. spinifera*.

XVIII. NUTTALLIANAE.

Represented in the Pacific States by one species.

34. *A. Nuttallii falcata*.

XIX. CANESCENTES.

Bracts 7–25 mm. long, the free portion equaling or usually shorter than the wings; leaves over 2 mm. wide.

35. *A. canescens*.

Bracts 4–6 mm. long, the free portion much longer than the wings; leaves 2 mm. or less in width.

36. *A. linearis*.

1. *Atriplex hortensis* L. Garden Orache or Sea Purslane. Fig. 1501.

Atriplex hortensis L. Sp. Pl. 1053. 1753.

Stout erect annual, 5–25 dm. high, branches few, ascending, obtusely angled, soon glabrate. Lower leaves opposite, the upper alternate, broadly triangular to oblong-lanceolate, 5–15 cm.

long, acute or obtuse at apex, rounded or truncate at base, often hastate, sinuate-dentate to entire, farinose when young, glabrate in age; flowers monoecious, in interrupted paniculate slender spikes; pistillate flowers sometimes with 3-5-lobed calyx, but most of them without calyx and enclosed by 2 bracts; fruiting bracts broadly oval or ovate, 5-18 mm. long, united only at base, rounded to acute at apex, entire or denticulate; seed 2 mm. long, black.

Low ground, Upper Sonoran and Transition Zones; introduced about Klamath Falls, Oregon, and in the San Francisco Bay region. Native of central Asia. July-Sept. A crimson-leaved horticultural variety is sometimes cultivated as an ornamental.

2. *Atriplex Gmelinii* C. A. Mey. Gmelin's Saltweed or Orache. Fig. 1502.

Atriplex Gmelinii C. A. Mey. Mém. Acad. St. Pétersb. VI. 4²: 160. 1838.

Atriplex angustifolia var. *obtusa* Cham. Linnaea 6: 569. 1831.

Atriplex patula subsp. *obtusa* Hall & Clements, Carnegie Inst. Wash. Pub. no. 326: 252. 1923.

Erect or decumbent annual, 1-5 dm. high, the branches succulent, finely farinose when young, soon glabrate. Lower leaves opposite, upper alternate, oblong or narrowly oblong, the uppermost usually linear, 15-50 mm. long, petioled, usually entire, rarely inconspicuously toothed below or rarely hastate, thin, finely farinose when young, becoming glabrous and bright green; flowers monoecious, in dense interrupted terminal and axillary spikes; bracts sessile, ovate-rhombic or ovate-oblong, obtuse or acute, 3-12 mm. long, united at base, entire or rarely sub-hastate.

On or near the seashore, Canadian Zone; Alaska to central California. Type locality: Eschscholtz Bay, Kotzebue Sound, Alaska. Aug.-Nov.

Atriplex Gmelinii var. *zosteraefolia* (Hook.) Moq. in DC. Prod. 13²: 97. 1849. General habit of the typical species, but leaves and bracts linear. Straits of Juan de Fuca, Washington.

3. *Atriplex joaquiniana* A. Nels. San Joaquin Saltbush. Fig. 1503.

Atriplex spicata S. Wats. Proc. Amer. Acad. 9: 108. 1874. Not Stokes, 1812.

Atriplex joaquiniana A. Nels. Proc. Biol. Soc. Wash. 17: 99. 1904.

Atriplex patula subsp. *spicata* Hall & Clements, Carnegie Inst. Wash. Pub. no. 326: 251. 1923.

An erect annual, 3-10 dm. high, the branches few, stout, ascending, farinose when young, glabrate in age. Leaves except the lowest alternate, deltoid to ovate-rhombic, 3-7 cm. long, often as broad, sinuate-dentate or repand-dentate, or the upper entire and narrower with slender petioles, farinose when young, green and glabrate in age; flowers in dense or interrupted naked spikes; fruiting bracts sessile, ovate-oblong or round-deltoid, 3 mm. long, united at the rounded or truncate base, obtuse or acutish, not margined or appendaged, or the sides faintly tuberculate.

Alkaline soils, Upper Sonoran Zone; Sacramento and San Joaquin Valleys and the Inner Coast Ranges of central California. Type locality: Livermore Pass, California. April-Sept.

4. *Atriplex patula* L. Spear Orache or Saltbush. Fig. 1504.

Atriplex patula L. Sp. Pl. 1053. 1753.

Annual with erect to procumbent branches, 3-9 dm. high, furfuraceous when young, usually becoming glabrous and green. Leaves lanceolate to rhombic-lanceolate, 2.5-8 cm. long, short-petioled, cuneate at base, or the lower sometimes hastate, entire or sometimes sinuate-dentate, bright green and glabrous or thinly farinose beneath; fruiting bracts rhombic-oval, 2-6 mm. long, often slightly hastate, acute or acutish, denticulate, tuberculate on the sides, united only at the rounded or broadly cuneate base.

Salt marshes, Boreal to Sonoran Zones; British Columbia to southern California; also on the Atlantic Coast and in Eurasia. Type locality: Europe. July-Nov.

5. *Atriplex hastata* L. Halberd-leaved Orache or Saltbush. Fig. 1505.

Atriplex hastata L. Sp. Pl. 1053. 1753.

Atriplex patula var. *hastata* A. Gray, Man. ed. 5. 409. 1867.

Annual with procumbent to erect stems, 3-9 dm. high, usually much branched, more or less furfuraceous, glabrate in age and green or stramineous. Lower leaves triangular-hastate to rounded-deltoid, 2.5-7 cm. long, acute at apex, usually truncate at base, sinuate-dentate or shallowly repand, rarely entire, the basal lobes acute; upper leaves oblong-hastate to lanceolate, usually entire, bright green or densely furfuraceous; flowers in dense uninterrupted often paniculate spikes; fruiting bracts ovate-deltoid or orbicular-deltoid, 3-7 mm. long, acute or acutish at apex, denticulate, the sides usually tuberculate, united only at the truncate or rounded base.

Mostly in saline soils near the coast, Boreal to Sonoran Zones; British Columbia to southern California and across the continent, also in the Old World. More common in the Pacific States than the preceding species to which it is closely related. Type locality: Europe. June-Nov.

6. *Atriplex rosea* L. Red Orache or Saltbush. Fig. 1506.

Atriplex rosea L. Sp. Pl. ed. 2. 1493. 1763.

Atriplex spatiosa A. Nels. Bot. Gaz. 34: 360. 1902.

Annual, with erect much branched stems, 3-10 dm. high, the branches ascending or spreading, terete, stramineous or white, furfuraceous or glabrate. Leaves numerous, 2-8 cm. long, the petals one-third the length of the blade, ovate to rhombic-ovate, cuneate or rounded at base, sinuate-dentate or repand-dentate, green or usually grayish, sparsely to densely mealy; flowers in axillary

glomerules and usually interrupted terminal spikes; fruiting bracts sessile, rhombic to cuneate-orbicular, 4–12 mm. long, united only at base, acute at apex, dentate, the sides usually short-tuberculate.

Alkaline soils, Transition and Sonoran Zones; southeastern Washington to southern California, east to Wyoming and northern Mexico, adventive on the Atlantic Coast; also widely distributed in Eurasia, northern Africa, and Australia. Type locality: southern Europe. July–Nov.

Atriplex Lindleyi Moq. in DC. Prod. 13²: 100. 1849. An erect or ascending perennial, 2–4 dm. high, the branches terete, white-furfuraceous. Lower leaves with petioles over half the length of the blade, the upper sessile, ovate or ovate-rhombic, 10–15 mm. long, acute or obtuse, cuneate or attenuate at base; flowers monoecious, spicate or in axillary glomerules; fruiting bracts 8–12 mm. long, hemispheric or broadly turbinate, inflated and loosely spongy, bordered by a narrow wing or an acute angle, united except for a small orifice concealed by small entire or 3-toothed valves. Native of Australia, sparingly escaped from cultivation in San Diego County, California.

7. *Atriplex Phyllostegia* (Torr.) S. Wats. Arrow Saltbush. Fig. 1507.

Obione Phyllostegia Torr. ex S. Wats. Bot. King Expl. 291. 1871.

Atriplex Phyllostegia S. Wats. Proc. Amer. Acad. 9: 108. 1874.

Endolepis Phyllostegia Rydb. Bull. Torrey Club 39: 312. 1912.

Endolepis Covillei Standley, N. Amer. Fl. 21: 73. 1916.

Atriplex Covillei J. F. Macbride, Contr. Gray Herb. no. 53: 11. 1918.

Annual with much branched erect stems, 2–6 dm. high, the branches terete, mostly ascending, sparsely furfuraceous or glabrate. Leaves broadly ovate to deltoid-ovate, 2–5 cm. long, acute or acuminate, truncate or cuneate at base, thin, green and sparsely furfuraceous or glabrous, the petioles slender, equaling the leaves; flowers monoecious or some plants with only pistillate flowers; fruiting bracts often short-pedicelled, 5–20 mm. long, lanceolate-oblong, entire or laciniate, united nearly to the apex which is prolonged into an oblong or linear lobe, the sides often bearing linear protuberances.

Alkaline soils, Sonoran Zones; Klamath and Lake Counties, Oregon, the San Joaquin Valley and Mojave Desert, California, east to Utah and northern Arizona. Type locality: between Truckee and Humboldt Rivers, western Nevada. April–Aug.

8. *Atriplex truncata* (Torr.) A. Gray. Truncate Saltbush. Fig. 1508.

Obione truncata Torr. ex S. Wats. Bot. King Expl. 291. 1871.

Atriplex truncata A. Gray, Proc. Amer. Acad. 8: 398. 1872.

Atriplex truncata var. *stricta* A. Gray, loc. cit.

Annual with erect sparsely branched stems, 2–10 dm. high, the branches mostly ascending, obtusely angled, furfuraceous or glabrate below. Leaves grayish furfuraceous, especially beneath, round-ovate or deltoid-ovate, often somewhat hastate, 1.5–4 cm. long, the lower short-petioled and truncate or abruptly cuneate at base, the upper sessile and often cordate-clasping; flowers monoecious, in axillary glomerules; fruiting bracts 2–3 mm. long, broadly cuneate, united to the truncate or broadly rounded, shallowly 3-toothed apex, the sides smooth, or obscurely tuberculate.

Alkaline soils, Arid Transition and Upper Sonoran Zones; British Columbia southward, east of the Cascade-Sierra Nevada Divide, to eastern California, and east to Colorado and New Mexico. Type locality: on the Truckee River, Nevada. May–July.

9. *Atriplex coronata* S. Wats. Crown Saltbush or Crown-scale. Fig. 1509.

Atriplex coronata S. Wats. Proc. Amer. Acad. 9: 114. 1874.

Atriplex verna Jepson, Pittonia 2: 305. 1892.

Atriplex elegans var. *coronata* M. E. Jones, Contr. West. Bot. No. 12: 6. 1908.

Annual, the stems erect, much branched, 1–4 dm. high, the branches terete, furfuraceous, becoming glabrate. Leaves many, the lower short-petioled, the upper sessile, ovate to ovate-oblong or lanceolate, 10–25 mm. long, cuneate or rounded at base, acute at apex, entire, thin and furfuraceous or often glabrate above; flowers monoecious, both kinds in the same axillary clusters; fruiting bracts flabellate or broadly rhombic, 4–5 mm. long, united to above the middle, laciniate-dentate, the sides slightly or abundantly tuberculate.

Alkaline soils, Sonoran Zones; Sacramento Valley to southern California. Type locality: Livermore Pass, California. May–July.

10. *Atriplex argentea* Nutt. Silver Saltbush or Silver-scale. Fig. 1510.

Atriplex argentea Nutt. Gen. 1: 198. 1818.

Annual, erect, much branched and bushy, the branches angled, ascending or divaricate, white-furfuraceous. Lower leaves short-petioled, the upper subsessile, 2–6 cm. long, deltoid-ovate or round-ovate, rounded or broadly cuneate at base and often slightly hastate, entire, sparingly dentate or undulate, densely grayish furfuraceous; flowers monoecious, usually both kinds in the same clusters; fruiting bracts compressed, obovate, 4–8 mm. long, united to near the apex, the free green margins extending nearly to the base, dentate, the sides slightly tuberculate.

Alkaline soils, Arid Transition and Upper Sonoran Zones; Saskatchewan to eastern Oregon and northeastern California, east to North Dakota and New Mexico. Type locality: on sterile and saline places near the Missouri River. June–Oct.

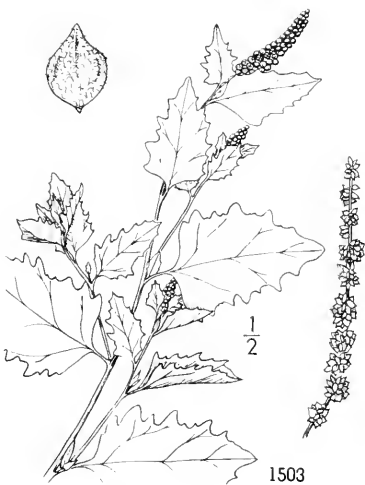
Atriplex argentea var. *Hillmanii* M. E. Jones, Contr. West. Bot. No. 11: 21. 1903. (*A. Hillmanii* Standley, N. Amer. Fl. 21: 48. 1916.) Low spreading plants, bracts not compressed, sessile, indurate, with acutely dentate margins, the sides covered with flat, acute crest-like appendages. Southeastern Oregon and western Nevada, on alkaline plains.



1501



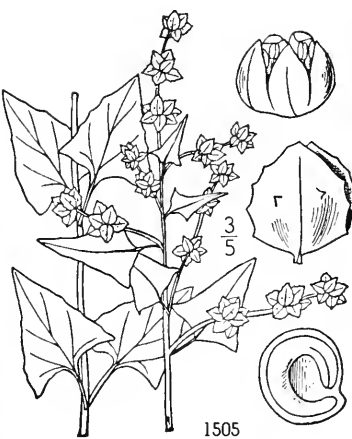
1502



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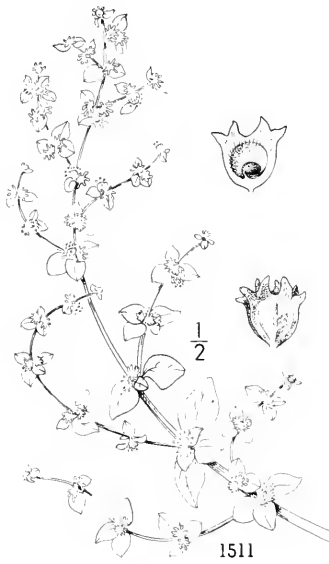
1501. *Atriplex hortensis*
1502. *Atriplex Gmelinii*
1503. *Atriplex joaquiniana*

1504. *Atriplex patula*
1505. *Atriplex hastata*
1506. *Atriplex rosea*

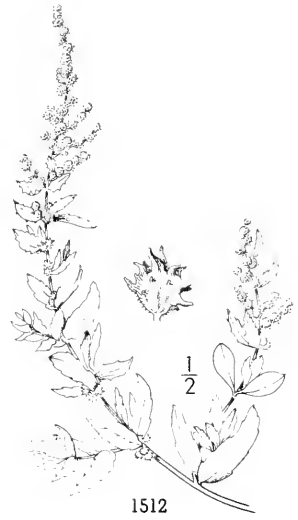
1507. *Atriplex Phyllostegia*
1508. *Atriplex truncata*
1509. *Atriplex coronata*



1510



1511



1512



1513



1514



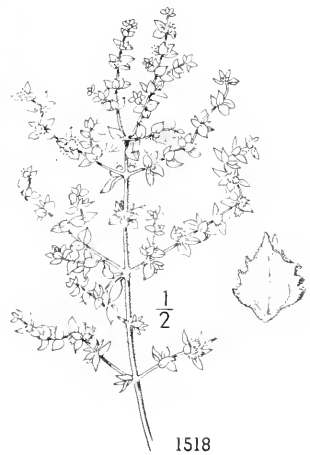
1516



1515



1517



1518

1510. *Atriplex argentea*
1511. *Atriplex expansa*
1512. *Atriplex Serenana*

1513. *Atriplex Davidsonii*
1514. *Atriplex pacifica*
1515. *Atriplex Coulteri*

1516. *Atriplex cordulata*
1517. *Atriplex tularensis*
1518. *Atriplex Parishii*

11. *Atriplex expansa* var. *mohavensis* M. E. Jones. Mojave Silver-scale or Fogweed. Fig. 1511.

Atriplex trinervata Jepson, Pittonia 2: 305. 1892.

Atriplex expansa var. *mohavensis* M. E. Jones, Contr. West. Bot. no. 11: 20. 1903.

Atriplex mohavensis Standley, N. Amer. Fl. 21: 47. 1916.

Atriplex sordida Standley, N. Amer. Fl. 21: 47. 1916.

Annual, with erect or spreading much branched stems, 2-5 dm. high, the branches obtusely angled, furfuraceous. Leaves broadly deltoid to broadly ovate, 1-7 cm. long, the lower short-petioled, upper sessile, truncate or subcordate or the uppermost smaller and clasping, entire or somewhat sinuate-dentate, thin, more or less furfuraceous, becoming glabrate; staminate flowers mostly in terminal spikes, the pistillate in axillary clusters; fruiting bracts sessile, cuneate-orbicular, 3-5 mm. long, compressed, united to above the middle, the margins free and green, acutely dentate, the sides usually smooth, rarely tuberculate or cristate.

Alkaline soils, Upper and Lower Sonoran Zones; Sacramento Valley to southern California and western Arizona. The typical species is in western Texas and New Mexico, the two merging in Arizona. July-Nov.

12. *Atriplex Serenana* A. Nels. Bracted Saltbush or Bract-scale. Fig. 1512.

Obione bracteosa Dur. & Hilg. Pacif. R. Rep. 5: 13. 1858.

Atriplex bracteosa S. Wats. Proc. Amer. Acad. 9: 115. 1874. Not Trautv. 1870.

Atriplex Serenana A. Nels. Proc. Biol. Soc. Wash. 17: 99. 1904.

Annual, with erect or decumbent usually much branched stems, 3-10 dm. high, the branches obtusely angled, furfuraceous when young. Leaves numerous, sessile or subsessile, grayish green and sparsely mealy, oblong or oval, 2-8 cm. long, cuneate at the base, dentate or the upper usually entire; flowers monoecious, the staminate in terminal spikes, the pistillate in small axillary clusters; fruiting bracts short-pedicelled, broadly cuneate, 2-2.5 mm. long, compressed, united below, rounded and acutely toothed at apex, the sides rarely obscurely tuberculate.

Saline soils, Sonoran Zones; Sacramento Valley to northern Lower California and western Nevada. Type locality: Poso Creek, Kern County, California. April-Oct.

13. *Atriplex Davidsonii* Standley. Davidson's Saltbush. Fig. 1513.

Atriplex Davidsonii Standley, N. Amer. Fl. 21: 57. 1916.

Annual with prostrate much branched stems, the branches slender, terete, stramineous, 1-4 dm. long. Leaves numerous, sessile or subsessile, 7-14 mm. long, oblong to lanceolate-oblong, acute or acuminate at the apex, obtuse or cuneate at base, repand-denticulate or dentate or the uppermost entire, finely furfuraceous, staminate flowers in short naked terminal spikes or in axillary glomerules, pistillate in few-flowered axillary clusters; fruiting bracts sessile, suborbicular, 3 mm. long, compressed, united to the middle, acutely dentate, the terminal tooth usually longest, sides smooth or usually with 2 tubercles.

Alkaline soils, Upper Sonoran Zone; near the coast, southern California. Type locality: Balboa, Orange County, California. May-Oct.

14. *Atriplex pacifica* A. Nels. Pacific Saltbush. Fig. 1514.

Obione microcarpa Benth. Bot. Sulph. 48. 1844.

Atriplex microcarpa D. Dietr. Syn. Pl. 5: 536. 1852. Not Waldst. & Kit. 1812.

Atriplex pacifica A. Nels. Proc. Biol. Soc. Wash. 17: 99. 1904.

Annual, with prostrate much branched stems, 1-4 dm. long, the branches slender, obtusely angled, furfuraceous when young. Leaves numerous, sessile or the lower short-petioled, 6-14 mm. long, oblong to obovate-oblong or oval, acute or obtuse at apex, cuneate at base, densely furfuraceous; staminate flowers in the upper axils, usually in large glomerules, the pistillate in small clusters in the lower axils, fruiting bracts sessile, obovate to suborbicular, 1-1.5 mm. long, united to the middle, minutely 3-5-toothed at apex, the sides smooth or rarely obscurely tuberculate.

Saline soils near the coast, Sonoran Zones; Los Angeles County, California, to Lower California, and on the adjacent islands. Type locality: San Diego, California. March-Oct.

15. *Atriplex Coulteri* (Moq.) D. Dietr. Coulter's Saltbush. Fig. 1515.

Obione Coulteri Moq. in DC. Prod. 13²: 113. 1849.

Atriplex Coulteri D. Dietr. Syn. Pl. 5: 537. 1852.

Perennial or flowering as an annual, often woody at base, much branched, the branches 1-10 dm. long, terete, furfuraceous at least when young, often glabrate and reddish in age. Leaves numerous, sessile or short-petioled, 7-15 mm. long, obovate to oblanceolate or elliptic, obtuse to acuminate at apex, cuneate at base, entire, thin, loosely furfuraceous; staminate flowers in the upper axils or in short naked spikes, pistillate in small axillary clusters; fruiting bracts sessile, 2-3 mm. long, obovate, obtuse at apex, united to the middle, the free margins sharply dentate, the sides with a few pointed tubercles or smooth.

Saline soils near the coast, Sonoran Zones; southern California to Lower California and on the adjacent islands. Type locality: California. March-Oct.

16. *Atriplex cordulata* Jepson. Heart-leaved Saltbush or Heart-scale. Fig. 1516.*Atriplex cordulata* Jepson, Pittonia 2: 304. 1892.

Annual with erect much branched stems, 15–35 cm. high, the branches stout, spreading or ascending, furfuraceous and stramineous. Leaves numerous, sessile, broadly cordate-ovate, 5–10 mm. long, acute or obtuse at apex, clasping at base, entire, white-furfuraceous and firm; staminate and pistillate flowers mixed in small axillary clusters; fruiting bracts sessile or subsessile, ovate-orbicular, 3 mm. long, compressed, acute at apex, united to the middle, deeply and acutely dentate, the sides slightly tuberculate or smooth.

Alkaline soils, Sonoran Zones; Sacramento and San Joaquin Valleys, California. Type locality: near Little Oak, Solano County, California. April–Sept.

Atriplex vallicola Hoover, Leaflets West. Bot. 2: 130. 1938. Closely resembling *A. cordulata* Jepson. Leaves cordate or subcordate at base, 2–7 mm. long; inflorescence very dense, the staminate and pistillate flowers mixed in axillary clusters; fruiting bracts thick, 2–3.5 mm. broad, united except at apex of the largest teeth, irregular in shape, upper margin undulate and with a few larger irregular teeth. Imperfectly known species of the San Joaquin Valley, California. Described from old plants found five miles north of Lost Hills oil field, Kern County, and at Mendota, Fresno County, California.

17. *Atriplex tularensis* Coville. Tulare Saltbush. Fig. 1517.*Atriplex tularensis* Coville, U.S. Nat. Herb. 4: 182. 1893.*Atriplex cordulata* var. *tularensis* Jepson, Fl. Calif. 436. 1914.

Annual, with erect sparsely branched stems, 15–40 cm. high, the branches ascending, terete, densely furfuraceous, often tinged with red. Leaves sessile, ovate to lanceolate, 6–20 mm. long, broadly cuneate or rounded at base, acute or acuminate at apex, entire, densely furfuraceous, thick; staminate flowers in small axillary clusters, the pistillate solitary or in small axillary clusters, the two often mixed; fruiting bracts sessile, rhombic-ovate, 3–3.5 mm. long, acute or acuminate, united to the middle, the free margins with 1–3 teeth, sides not tuberculate, white-furfuraceous.

Alkaline soils, Lower Sonoran Zones; upper San Joaquin Valley, California. Type locality: on the Tulare Plains of California, about 15 miles south of Bakersfield. May–Sept.

18. *Atriplex Parishii* S. Wats. Parish's Saltbush or Brittle-scale. Fig. 1518.*Atriplex Parishii* S. Wats. Proc. Amer. Acad. 17: 377. 1882.*Atriplex depressa* Jepson, Pittonia 2: 304. 1892.*Atriplex minuscula* Standley, N. Amer. Fl. 21: 51. 1916.

Annual, 5–20 cm. high, much branched from the base, the branches horizontally spreading, stout and fragile, white-furfuraceous, glabrate and somewhat tinged with red in age. Leaves numerous, the upper imbricate, varying from all opposite to mainly alternate, sessile, ovate or the lower lanceolate, 4–10 mm. long, rounded at the base, acute at apex, entire, densely white-furfuraceous; staminate flowers mostly in the upper axils and the pistillate in the lower; fruiting bracts sessile, compressed, ovate or rhombic, usually slightly hastate, 3 mm. long, acute at apex, the margins united to above the middle, entire or with a few prominent teeth on each side, the sides smooth or tuberculate.

Alkaline soils, Sonoran Zones; Sacramento Valley to San Diego County, California, east to the western edges of the southern California deserts. Type locality: Almond (Costa Station), Orange County, California. June–Oct.

19. *Atriplex pusilla* (Torr.) S. Wats. Small Saltbush, Small-scale. Fig. 1519.*Obione pusilla* Torr. ex S. Wats. Bot. King Expl. 291. 1871.*Atriplex pusilla* S. Wats. Proc. Amer. Acad. 9: 110. 1874.

Erect annual, much branched throughout, 5–25 cm. high, the branches slender, sparsely furfuraceous, often red. Leaves numerous, imbricate above, sessile, ovate to oblong-lanceolate, 3–8 mm. long, acute or acuminate, rounded or obtuse at the base, entire, furfuraceous; flowers monoecious, solitary or sometimes in pairs in the axils; fruiting bracts sessile, ovate, compressed, 1–2 mm. long, acute or acuminate, entire, the sides smooth.

Alkaline soils, Upper Sonoran Zone; southeastern Oregon and northeastern California to western Nevada. Type locality: on the edge of a dried alkali flat near the head of Humboldt Valley, Nevada. June–Sept.

20. *Atriplex fasciculata* S. Wats. Salton Saltbush. Fig. 1520.*Atriplex fasciculata* S. Wats. Proc. Amer. Acad. 17: 377. 1882.*Atriplex elegans* var. *fasciculata* M. E. Jones, Contr. West. Bot. No. 12: 76. 1908.*Atriplex saltonensis* Parish, Muhlenbergia 9: 57. 1913.

Annual with many erect or decumbent branches, 5–15 cm. high, usually slender, obtusely angled and densely furfuraceous. Leaves abundant, sessile or nearly so, cuneate-obovate to oblanceolate, 5–12 mm. long, entire, densely furfuraceous, rather thin; staminate and pistillate flowers mixed in the same small axillary clusters; fruiting bracts sessile, orbicular, 3 mm. long, compressed, united to the apex, the margins narrow, denticulate, the sides smooth, 1-nerved.

Slightly alkaline soils, Lower Sonoran Zone; Mojave and Colorado Deserts, California and adjacent Arizona. Type locality: near Fish Ponds, Mojave Desert. Feb.–June.

21. *Atriplex californica* Moq. California Saltbush. Fig. 1521.*Atriplex californica* Moq. in DC. Prod. 139: 98. 1849.

Herbaceous perennial from a fleshy fusiform root, branching from the base, the branches prostrate or decumbent, 2–5 dm. long, terete, furfuraceous-canescens. Leaves numerous, usually

crowded, elliptic to lanceolate or oblanceolate, 1–2 cm. long, acute at apex, narrowed at base, sessile, entire, furfuraceous-canescens; flowers in dense axillary clusters, forming naked or leafy spikes; fruiting bracts sessile, 3 mm. long, ovate, often broadly so, acute, distinct, entire.

Usually in sandy soil, mainly Sonoran Zones; along the coast from central California to Cedros Island, Lower California. Type locality: California. April–Nov.

22. *Atriplex semibaccata* R. Br. Australian Saltbush. Fig. 1522.

Atriplex semibaccata R. Br. Prod. 406. 1810.

Atriplex denticulata Moq. in DC. Prod. 132: 97. 1849.

Atriplex flagellaris Wootton & Standley, Contr. U.S. Nat. Herb. 16: 119. 1913.

Perennial, the stems much branched, prostrate, woody at base, the branches slender, terete, 3–10 dm. long, whitish, sparsely furfuraceous or glabrate. Leaves numerous, short-petioled, oblong to oblong-obovate, 10–35 mm. long, acute or obtuse at apex, cuneate or attenuate at base, irregularly repand-dentate or the upper entire, thin, green and usually glabrate above, more or less densely furfuraceous beneath; staminate flowers usually in small terminal clusters, the pistillate usually solitary in the lower axils; fruiting bracts sessile, rhombic, 4–5 mm. long, united at base, compressed, denticulate or entire, the sides nerved, but otherwise smooth, becoming red and fleshy in age.

Roadsides and waste places, Sonoran Zones; introduced from Australia and well established in southern California. April–Dec.

23. *Atriplex leucophylla* (Moq.) D. Dietr. Beach Saltbush or Sea-scale. Fig. 1523.

Obione leucophylla Moq. in DC. Prod. 132: 109. 1849.

Atriplex leucophylla D. Dietr. Syn. Pl. 5: 536. 1852.

Perennial, the stems procumbent or decumbent, woody at the base, much branched, 3–10 mm. long, stout, terete, densely and coarsely furfuraceous. Leaves numerous, sessile, oblong or oval to orbicular, 15–40 mm. long, obtuse to rounded at apex, cuneate or rounded at base, entire, densely whitish or somewhat yellowish, furfuraceous; staminate flowers in dense terminal spikes, the pistillate in few-flowered axillary clusters; fruiting bracts sessile, 5–7 mm. long, broadly ovate, spongy, not compressed, acutish, united to the middle, entire or dentate, usually with many stout often flattened tubercles on the sides, densely furfuraceous.

Sea beaches, Transition and Sonoran Zones; Humboldt Bay, California, to Viscaino Bay, Lower California. Type locality: California. April–Oct.

24. *Atriplex fruticulosa* Jepson. Ball Saltbush. Fig. 1524.

Atriplex fruticulosa Jepson, Pittonia 2: 306. 1892.

Perennial, the stems several, erect, fruticose at base, 15–35 cm. high, simple below, branched above, the branches ascending. Leaves numerous, all alternate, the lower mostly short-petioled, the upper sessile, narrowly elliptic to linear-lanceolate, 5–20 mm. long, cuneate or rounded at base, acutish at apex, entire, somewhat coriaceous, densely furfuraceous; staminate flowers in dense, interrupted terminal spikes, the pistillate in small axillary clusters; fruiting bracts sessile, 3–4 cm. long, orbicular or orbicular-obovate, compressed, united to above the middle, narrowly margined and acutely dentate above the middle, the sides tooth-crested or mucronate, indurate.

Alkaline soils, Sonoran Zones; Sacramento and San Joaquin Valleys, California. Type locality: near Little Oak, Solano County, California. March–Nov.

25. *Atriplex Watsonii* A. Nels. Watson's Saltbush. Fig. 1525.

Atriplex decumbens S. Wats. Proc. Amer. Acad. 12: 275. 1877.

Atriplex Watsonii A. Nels. Proc. Biol. Soc. Wash. 17: 99. 1904.

Perennial, the stems much branched, prostrate or decumbent, 2–10 dm. long, fruticose at base, densely furfuraceous. Leaves numerous, mostly opposite, sessile, broadly ovate to ovate-oblong, 8–15 mm. long, acute or acutish at apex, rounded or obtuse at base, entire, somewhat coriaceous, densely furfuraceous; flowers dioecious, the staminate in short, usually simple terminal spikes, the pistillate in small axillary clusters; fruiting bracts sessile or nearly so, triangular or rhombic, 4–6 mm. long, compressed, united to above the middle, acute, sparsely denticulate above or rarely entire, the sides smooth, coriaceous.

Sea beaches and bluffs, Sonoran Zones; Santa Barbara County, California, to San Quentin Bay, Lower California. Type locality: near San Diego, California. April–Oct.

26. *Atriplex hymenelytra* (Torr.) S. Wats. Desert Holly. Fig. 1526.

Obione hymenelytra Torr. Pacif. R. Rep. 4: 129. 1857.

Atriplex hymenelytra S. Wats. Proc. Amer. Acad. 9: 119. 1874.

An erect, much branched shrub, 3–12 dm. high, the branches terete, densely white-furfuraceous. Leaves petioled, orbicular to rhombic, 15–35 mm. long, often truncate, subcordate or short-cuneate at base, obtuse at apex, deeply and irregularly dentate, thick and densely white-furfuraceous; flowers dioecious, the staminate in dense glomerules or paniculate spikes, the pistillate in short dense spikes; fruiting bracts 7–10 mm. long, short-stalked, orbicular or subreniform, distinct, entire, densely furfuraceous, thin.

Alkaline soils, but usually on hillsides or in washes rather than flats, Lower Sonoran Zone; deserts of southern California to southern Utah and western Arizona, Sonora, and Lower California. Type locality: hilly and gravelly places, on Williams River, Arizona. Feb.–April.



1519



1520



1521



1522



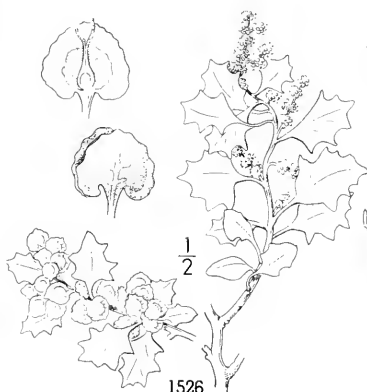
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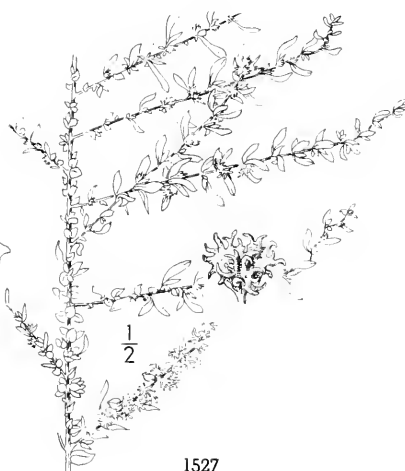
1524



1525



1526



1527

1519. *Atriplex pusilla*
1520. *Atriplex fasciculata*
1521. *Atriplex californica*

1522. *Atriplex semibaccata*
1523. *Atriplex leucophylla*
1524. *Atriplex fruticulosa*

1525. *Atriplex Watsonii*
1526. *Atriplex hymenelytra*
1527. *Atriplex polycarpa*

27. *Atriplex polycarpa* (Torr.) S. Wats. Many-fruited Saltbush, All-scale.
Fig. 1527.

Obione polycarpa Torr. Pacif. R. Rep. 4: 130. 1847.

Atriplex polycarpa S. Wats. Proc. Amer. Acad. 9: 117. 1874.

Atriplex curvidens Brandg. Proc. Calif. Acad. II. 2: 201. 1889.

An erect, much branched shrub, 1–2 m. high, woody throughout, the branches slender, divaricate, terete, gray-furfuraceous, becoming smooth and yellowish in age, old stems with a dark gray bark. Leaves numerous, alternate, spatulate to obovate or oblong, sessile or nearly so, 3–15 mm. or rarely 25 mm. long, often with smaller leaves in the axils, entire and rather thick, densely gray-furfuraceous; flowers dioecious, the staminate in dense or interrupted, simple or paniculate, naked spikes, the pistillate in small clusters, these being sparsely leafy, paniculate spikes; fruiting bracts sessile, cuneate-orbicular, 2–3 mm. broad and usually broader than long, free, spongy, united to the middle or rarely free to the base, the margins deeply laciniate-dentate with linear teeth, the sides cristate-appendaged, tuberculate or sometimes smooth.

Alkaline soils, Lower Sonoran Zone; San Joaquin Valley and the deserts of southern California to southern Utah, Sonora, and Lower California. Type locality: valley of the Gila River, Arizona. Aug.–Oct.

28. *Atriplex Tórreyi* S. Wats. Torrey's Saltbush. Fig. 1528.

Obione Torreyi S. Wats. Bot. King Expl. 290. 1871.

Atriplex Torreyi S. Wats. Proc. Amer. Acad. 9: 119. 1874.

An erect, much branched shrub, 6–20 dm. high with stout angled branches and divergent, spinose-tipped branchlets, white-furfuraceous when young, becoming glabrate and the older stems with grayish bark. Leaves with petioles about 5 mm. long or the upper subsessile, triangular to ovate or oblong, often subhastate, entire, thick and densely white-furfuraceous; flowers dioecious, both kinds in dense naked spikes; fruiting bracts orbicular to subreniform, sessile, 2–3 mm. long, strongly compressed, distinct, the margins obscurely crenate-denticulate.

Alkaline soils, Sonoran Zones; northern Nevada to the Mojave Desert, California, southern Utah, and northern Arizona. Type locality: dry valleys bordering the Truckee and Carson Rivers, Nevada. June–Sept.

29. *Atriplex Bréweri* S. Wats. Brewer's or Coast Saltbush. Fig. 1529.

Atriplex Breweri S. Wats. Proc. Amer. Acad. 9: 119. 1874.

Atriplex orbicularis S. Wats. Proc. Amer. Acad. 17: 377. 1882.

Atriplex lentiformis subsp. *Breweri* Hall & Clements, Carnegie Inst. Wash. Pub. no. 326: 335. 1923.

An erect, much branched shrub, 10–25 dm. high, the branches terete or obscurely angled, rather flexuous, densely and finely furfuraceous, glabrate in age; flowers dioecious. Leaves ovate to ovate-deltoid or rhombic, 15–50 mm. long, cuneate at base or subtruncate and abruptly narrowed to a short petiole, finely furfuraceous on both surfaces; flowers dioecious or monoecious, both kinds in dense or interrupted paniculate spikes, naked or leafy; fruiting bracts orbicular or broadly ovate, 2–3 mm. long, strongly convex, united to near the middle, the margins entire.

Saline soils, along the coast; San Francisco Bay to Orange County, extending inland into San Benito and Salinas Valleys, California. Type locality: Santa Monica, California. July–Oct.

Atriplex nummulària Lindl. in Mitch. Journ. Trop. Austr. 64. 1848. (*Atriplex Johnstonii* C. B. Wolf, Occas. Papers Rancho Santa Ana Bot. Gard. I. no. 1: 3. 1935.) Erect shrub, 2–3 m. high, monoecious or some plants dioecious, the branches mostly stiffly erect. Leaves grayish-green, thick, ovate to ovate-deltoid, 2–6 cm. long, subentire, undulate or irregularly dentate, obtuse; petioles 5–10 mm. long; inflorescence densely scurfy, the staminate forming dense paniculate spikes; fruiting bracts sessile, broadly orbicular, 6–12 mm. long, truncate at base, obtuse or rounded at apex, the margins united to the middle, usually few-toothed. Bluffs along the coast, Playa del Rey, Los Angeles County, California; native of Australia.

30. *Atriplex lentifórmis* (Torr.) S. Wats. Lens-fruited Saltbush or Quail
Brush. Fig. 1530.

Obione lentiformis Torr. in Sitgr. Rep. 169. 1853.

Atriplex lentiformis S. Wats. Proc. Amer. Acad. 9: 118. 1874.

An erect, much branched shrub, 1–4 dm. high, the branches spreading, rather slender, not spinose, terete, densely furfuraceous, becoming glabrate and whitish in age. Leaves ovate-deltoid to oblong, 15–50 mm. long, rounded or cuneate at base, short-petioled, rather thin, densely furfuraceous on both sides; flowers dioecious, the staminate in paniculate spikes, nearly naked and the branches slender, often drooping, pistillate in dense paniculate spikes; fruiting bracts orbicular-ovate, 3–4 mm. long, strongly compressed, united to above the middle, the margins finely crenulate, thin, furfuraceous.

Alkaline soils, Sonoran Zones; San Joaquin Valley and the deserts of southern California to southern Utah, Sonora, and Lower California. Type locality: on the lower Colorado River. Aug.–Oct.

31. *Atriplex Párryi* S. Wats. Parry's Saltbush. Fig. 1531.

Atriplex Parryi S. Wats. Proc. Amer. Acad. 17: 378. 1882.

An erect, much branched shrub, forming rounded clumps, 2–4 dm. high, the branches erect with slender divergent spinose branchlets, densely furfuraceous when young, the bark of older stems dark gray. Leaves mostly short-petioled, the upper sessile, 1–2 cm. long, ovate-deltoid to elliptic, cuneate at base or the sessile ones truncate, entire, or subhastate, densely whitish furfuraceous on both surfaces; flowers dioecious, the staminate glomerules forming interrupted leafy paniculate spikes, the pistillate in small clusters forming paniculate leafy spikes; fruiting

bracts 3 mm. long, sessile or nearly so, truncate-flabelliform, thick and rigid, united to above the middle, the margins entire, the sides smooth.

Alkaline soils, Lower Sonoran Zone; Mojave Desert, southern California, to western Nevada. Type locality: Lancaster, California. May–July.

32. *Atriplex confertifolia* (Torr.) S. Wats. Spiny Saltbush. Fig. 1532.

Obione confertifolia Torr. & Frem. in Frem. Second Rep. 318. 1845.

Obione spinosa Moq. in DC. Prod. 13²: 108. 1849.

Atriplex spinosa D. Dietr. Syn. Pl. 5: 536. 1852.

Atriplex confertifolia S. Wats. Proc. Amer. Acad. 9: 119. 1874.

An erect, much branched shrub, 3–12 dm. high, the branches stout, erect or ascending, the branchlets usually divaricate and spinose, densely furfuraceous when young. Leaves subsessile or short-petioled, broadly ovate to oval, 1–2 cm. long, cuneate to rounded at base, thick and densely furfuraceous; flowers dioecious, in small dense axillary glomerules; fruiting bracts broadly oval to suborbicular, 6–12 mm. long, united at the base, entire, densely furfuraceous.

Alkaline soils, mainly Upper Sonoran Zone; eastern Oregon, southward east of the Cascade–Sierra Nevada Divide to the Mojave Desert, California, eastward to North Dakota, Colorado, and Chihuahua. Type locality: borders of the Great Salt Lake. April–June. Sheep Fat, Shad-scale.

33. *Atriplex spinifera* J. F. Macbride. Mojave Saltbush. Fig. 1533.

Atriplex spinifera J. F. Macbride, Contr. Gray Herb. no. 53: 11. 1918.

An erect, much branched shrub, 3–15 dm. high, with rigid mostly erect branches, the branchlets divergent, terete, becoming rigid and spinose, densely white-furfuraceous when young, old stems with gray exfoliating bark. Leaves short-petioled or the upper sessile, crowded or scattered, ovate-deltoid to elliptic, 1–2 cm. long, or sometimes smaller, entire or subhastate, gray or whitish furfuraceous; fruiting bracts 7–15 mm. long, strongly convex below, forming a globose body, the margins above forming oblong or orbicular wings, entire or obscurely dentate, the sides smooth or sparsely cristate.

Alkaline soils, Sonoran Zones; San Joaquin Valley and the Mojave Desert, California. Type locality: Maricopa Hills, Kern County, California. May–June.

34. *Atriplex Nuttallii* var. *falcata* M. E. Jones. Nuttall's Saltbush. Fig. 1534.

Atriplex Nuttallii var. *falcata* M. E. Jones, Contr. West. Bot. No. 11: 19. 1903.

Atriplex falcata Standley, N. Amer. Fl. 21: 68. 1916.

Perennial, suffrutescent and much branched at base, the stems stout, terete, erect or decumbent, 2–5 dm. high, sparsely branched above, the branches furfuraceous. Leaves numerous, sessile or subsessile, narrowly oblong to linear, 1.5–5 cm. long, cuneate at base, entire, firm, closely furfuraceous; flowers dioecious, in axillary glomerules or forming interrupted paniculate spikes; fruiting bracts subsessile or sometimes stalked, narrowly oblong to ovate, 5–8 mm. long, united to near the apex, entire or sparingly denticulate, tuberculate and irregularly crested on the sides.

Alkaline soils, mainly Upper Sonoran Zone; southeastern Washington and eastern Oregon to central Nevada, and east to Idaho and northern Utah. The typical species ranges from Saskatchewan and Manitoba to northern Utah and Nebraska. Type locality: Weiser, Idaho. May–Aug.

35. *Atriplex canescens* (Pursh) Nutt. Hoary Saltbush. Fig. 1535.

Calligonum canescens Pursh, Fl. Amer. Sept. 370. 1814.

Atriplex canescens Nutt. Gen. 1: 197. 1818.

Obione tetraptera Benth. Bot. Sulph. 48. 1840.

Pterochiton occidentale Torr. in Frem. Second Rep. 318. 1845.

An erect, much branched shrub, 6–15 dm. high, the branches ascending or spreading, terete, white-furfuraceous, the old stems with gray exfoliating bark. Leaves numerous, sessile or nearly so, linear to narrowly oblong, usually broadest above the middle, 1–5 cm. long, cuneate to attenuate at base, thick and furfuraceous; flowers dioecious or rarely monoecious in more or less interrupted simple or paniculate leafy or nearly naked spikes; fruiting bracts stalked, the body of the bract indurate, ovoid, 7–13 mm. long, bearing on each side 2 prominent longitudinal wings, usually much surpassing the free portion of the bracts, furfuraceous or glabrate and green, the margins undulate or sharply dentate.

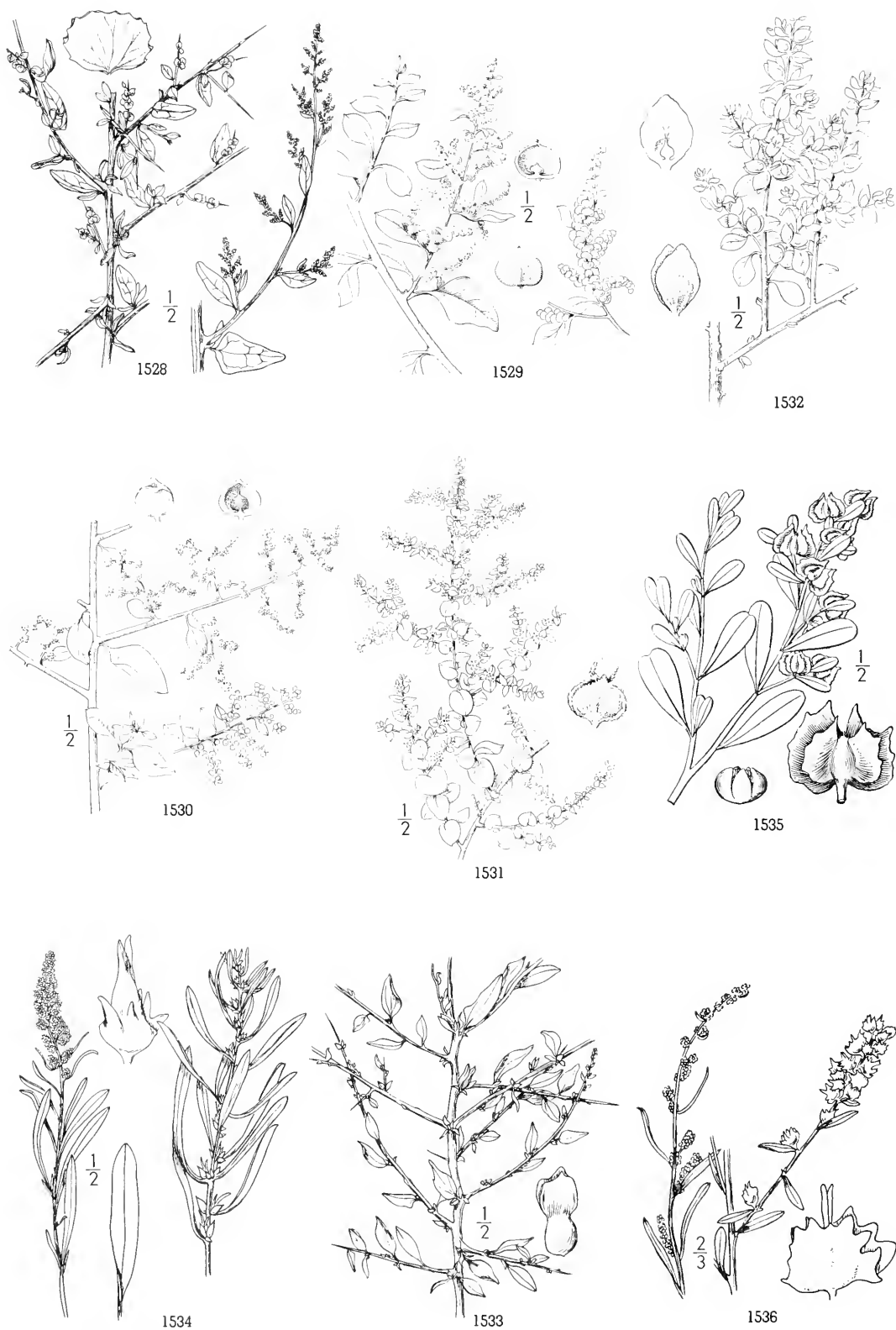
Dry plains and hillsides, Sonoran Zones; eastern Washington, southward east of the Cascade–Sierra Nevada Divide to the deserts of southern California, and ranging to South Dakota and Texas, Zacatecas, Mexico, and Lower California. Type locality: on the plains of the Missouri, near the Big Bend, South Dakota. May–July. Wing-scale.

36. *Atriplex linearis* S. Wats. Narrow-leaved Saltbush. Fig. 1536.

Atriplex linearis S. Wats. Proc. Amer. Acad. 24: 72. 1889.

An erect, much branched shrub, 3–25 dm. high, the branches ascending or spreading, terete, densely white-furfuraceous. Leaves sessile, linear, 1–5 cm. long, revolute, firm, densely white-furfuraceous; flowers dioecious in slender interrupted mostly paniculate spikes, or the pistillate sometimes in few-flowered axillary glomerules; fruiting bracts sessile or nearly so, lanceolate to ovate, 4–6 mm. long, each bract with a pair of thin wings about 3 mm. or less broad, irregularly dentate or laciniate, the free tips of the bracts much exceeding the wings.

Alkaline soils, Lower Sonoran Zone; Colorado Desert, California, to southern Arizona, Sonora, and Lower California. Type locality: alkaline soil about Guaymas, Sonora. May–July.



1528. *Atriplex* Torreyi
1529. *Atriplex* Breweri
1530. *Atriplex* lentiformis

1531. *Atriplex* Parryi
1532. *Atriplex* confertifolia
1533. *Atriplex* spinifera

1534. *Atriplex* Nuttallii
1535. *Atriplex* canescens
1536. *Atriplex* linearis

9. *GRAYIA* Hook. & Arn. Bot. Beechey 387. 1840.

Much branched usually spiny shrubs, with stellate-scurfy pubescence. Leaves rather fleshy, alternate, sessile and entire. Flowers unisexual and usually dioecious. Staminate flowers bractless, more or less glomerate; calyx 4-5-parted, membranaceous; stamens 4-5; pistillate flowers racemose, bracteolate; calyx none; stigmas 2; ovule erect. Utricle compressed, included in the accrescent bracts; seed free from the pericarp, orbicular; embryo annular; radicle inferior. [Name in honor of Asa Gray (1810-1888), American botanist.]

Two species, natives of the arid regions of western United States. Type species, *Grayia spinosa* (Hook.) Moq.

1. *Grayia spinosa* (Hook.) Moq. *Grayia* or Hop Sage. Fig. 1537.

Chenopodium spinosum Hook. Fl. Bor. Amer. 2: 127. 1838.

Grayia polygaloides Hook & Arn. Bot. Beechey 388. 1840.

Grayia spinosa Moq. in DC. Prod. 13²: 119. 1849.

Eremosemium spinosum Greene, Pittonia 4: 255. 1900.

An erect, much branched shrub, 3-12 dm. high, the branches ascending or spreading, sparsely stellate-scurfy when young, older stems with dark gray bark, branchlets mostly divergent, becoming rigid and spinescent. Leaves oblanceolate to oblong-oblanceolate, 5-40 mm. long, stellate-scurfy on both surfaces when young, usually glabrate in age; flowers in dense, crowded terminal spikes; fruiting bracts broadly obovate to orbicular, 4-15 mm. long, glabrous, often tinged with red, the broad dorsal wings thin, entire.

Usually in rocky or sandy soils on dry plains and hills, mainly Upper Sonoran Zone; in the Pacific States occurring east of the Cascade-Sierra Nevada Divide, and ranging from southeastern Washington to the Colorado Desert, California, and eastward to Wyoming, Colorado, and northern Arizona. Type locality: "interior of North California." Collected by Douglas in 1826, probably in the Columbia Basin of eastern Washington. April-June.

10. *EURÔTIA* Adans. Fam. Pl. 2: 260. 1763.

Low shrubs clothed with a dense stellate pubescence. Leaves alternate, slender, entire. Flowers monoecious or dioecious in small axillary clusters. Staminate flowers without bracts; calyx 4-parted, stamens 4. Pistillate flowers 2-bracteolate; bracts united to the apex, densely covered with long silky hairs, 2-horned; calyx none; styles 2, elongated; ovary ovoid. Seeds vertical, obovoid; radicle inferior. [Name Greek, meaning mould, in reference to the hoariness.]

A genus of two known species, the following and *Eurotia ceratoides* (L.) C. A. Mey. of Asia which is the type of the genus.

1. *Eurotia lanata* (Pursh) Moq. Winter Fat, Romeria. Fig. 1538.

Diotis lanata Pursh, Fl. Amer. Sept. 602. 1814.

Eurotia lanata Moq. Enum. Chenop. 81. 1840.

Eurotia subspinosus Rydb. Bull. Torrey Club 39: 312. 1912.

Low, erect shrub, 3-9 dm. high, with erect branches, hoary with a dense stellate pubescence usually with intermingling long-villous hairs. Leaves linear or linear-lanceolate, 15-50 mm. long, the margins entire and revolute, sessile or short-petioled; flowers monoecious, densely clustered in the upper axils; fruiting bracts lanceolate, 5-8 mm. long, densely villous; calyx-lobes pubescent, scarious-margined; seeds readily separable from the pericarp.

Dry rocky or sandy soils, Sonoran Zones; in the Pacific States occurring east of the Cascade-Sierra Nevada Divide and extending from eastern Washington to southern California, eastward to Saskatchewan, Texas, and Sonora. Type locality: "On the banks of the Missouri, in open places." Collected by Lewis and Clark. March-June.

11. *KÔCHIA* Roth in Schrad. Journ. Bot. 1: 307. *pl.* 2. 1801.

Herbs or low shrubs, with alternate or opposite, narrow entire leaves. Flowers perfect, often with pistillate ones intermixed, clustered in the axils or sometimes solitary. Calyx 5-lobed, the lobes incurved, in age developing a membranaceous horizontal wing on the lobes or the tube. Stamens 5, exserted. Stigmas 2 or 3. Utricle depressed-globose, the pericarp free from the horizontal seed. Embryo annular, surrounding the scanty endosperm. [Name in honor of W. D. J. Koch (1771-1849), director of the Botanical Garden at Erlangen.]

About 35 species, all but the following native of the Old World. Type species, *Kochia scoparia* (L.) Roth.

Flowering stems simple or nearly so; leaves nearly terete, about 1 mm. wide.

1. *K. americana*.

Flowering stems much branched; leaves flat, 1-3 mm. wide.

2. *K. californica*.

1. *Kochia americana* S. Wats. Red Sage. Fig. 1539.

Kochia americana S. Wats. Proc. Amer. Acad. 9: 93. 1874.

Kochia americana var. *vestita* S. Wats. loc. cit.

Perennial, with a stout woody root and a branched woody crown, the seasonal leafy branches

few to many, mostly simple, erect, 1–4 dm. high, more or less silky-pubescent, usually glabrate in age. Leaves narrowly linear, nearly terete, 1–3 cm. long, about 1 mm. thick, silky-pubescent to glabrate; fruiting calyx about 2 mm. broad, the wings fan-shaped, distinct, membranous; utricle glabrate; seed 2 mm. broad.

Alkaline soils, Sonoran Zones; Great Basin region from eastern Oregon to Wyoming, Colorado, and New Mexico. In the Pacific States confined to the alkaline plains of southeastern Oregon and Inyo County, California. Type locality: western Nevada. June–Aug. Red Molly.

2. *Kochia californica* S. Wats. Mojave Red Sage. Fig. 1540.

Kochia californica S. Wats. Proc. Amer. Acad. 17: 378. 1882.

Kochia americana var. *californica* M. E. Jones, Contr. West. Bot. No. 11: 19. 1903.

Stems several from the branched woody crown, 2–5 dm. high, paniculately much branched, herbage more or less densely silky-pubescent. Leaves flat, 1–2 cm. long, 1–3 mm. wide; flowers and fruit as in the preceding species.

Alkaline soils, Lower Sonoran Zone; Mojave Desert, California. Type locality: Mojave Desert, the station Colton cited by Watson being erroneous. Jan.–July.

12. *ECHINÓPSILON* Moq. Ann. Sci. Nat. II. 2: 127. 1834.

Annual or suffrutescent plants, often tomentose or pubescent. Leaves alternate, sessile, linear or lanceolate, entire. Flowers minute, solitary or glomerate in the axils, sessile, villous or tomentose. Calyx globose or depressed, the lobes 5, incurved, armed on the back with a usually hooked spine. Utricle enclosed by the coriaceous fruiting calyx; pericarp free from the orbicular horizontal seed; embryo annular. [Name Greek, meaning spine and bare, in reference to the spines on the calyx.]

An Old World genus of about 30 species. Type species, *Kochia sedoides* Schrad.

1. *Echinopsilon hyssopifolium* (Pall.) Moq. Hyssop-leaved Echinopsilon. Fig. 1541.

Salsola hyssopifolia Pall. Reise 1: 491. 1771.

Echinopsilon hyssopifolium Moq. in DC. Prod. 13²: 135. 1849.

Kochia hyssopifolia Boiss. Fl. Orien. 4: 926. 1879.

Bassia hyssopifolia Kuntze, Gen. Pl. 547. 1891.

Annual, pilose throughout; stems branching from the base and prostrate, 3–5 dm. long. Leaves narrowly linear-lanceolate, 2–4 cm. long, flat; flowers in few-flowered axillary glomerules; calyx-lobes broadly ovate, obtuse, about 1 mm. long, villous, armed with a stout spreading hooked spine; seed horizontal, lenticular, about 1 mm. in diameter.

A recent adventive from Europe but spreading rapidly especially in alkaline soils; well established in eastern Washington, California, and Nevada. July–Oct.

13. *CORISPÉRMUM* L. Sp. Pl. 4. 1753.

Annual herbs, glabrous or stellate-pubescent. Leaves narrow, sessile, entire. Flowers solitary or clustered in the axils of bracts, scarious-margined, forming spikes. Calyx minute, with 1–3 lobes, the posterior one larger and scarious. Stamens 1–5. Stigmas 2, recurved. Utricle orbicular to elliptic, plano-convex, the margin winged or acute. Seed erect, adherent to the membranous pericarp; embryo annular, surrounding the copious endosperm; radicle inferior. [Name Greek, meaning bug seed.]

About 10 species, natives of the north temperate and subarctic zones. Type species, *Corispermum hyssopifolium* L.

1. *Corispermum hyssopifolium* L. Common Bugseed. Fig. 1542.

Corispermum hyssopifolium L. Sp. Pl. 4. 1753.

Corispermum americanum Nutt. Trans. Amer. Phil. Soc. II. 5: 165. 1837.

Corispermum imbricatum A. Nels. in Coult. & Nels. Man. Bot. Rocky Mts. 164. 1909.

Corispermum marginale Rydb. Bull. Torrey Club 30: 247. 1903.

Stems much branched and spreading, 1.5–6 dm. long, striate, glabrate or stellate-villous, sparsely leafy, often tinged with red. Leaves linear, 1–7 cm. long, 1–3 mm. wide, cuspidate, glabrous or stellate-pubescent; spikes loosely to densely flowered; bracts lanceolate to ovate, usually erect, 4–10 mm. long; fruit 3.5–4.5 mm. long, conspicuously winged.

Sandy soils, Transition and Upper Sonoran Zones; in the Pacific States this species occurs on sandbars of Columbia River west of the Cascade Mountains, but is more generally distributed in eastern Washington and Oregon. Type locality: along the Volga River, Russia. July–Oct.

Corispermum nitidum Kit. ex Schult. Oestr. Fl. ed. 2. 1: 7. 1814. Similar to *C. hyssopifolium*, but the fruit smaller, 2–3 mm. long, and the lower bracts narrower than the fruit. Locally introduced on the banks of Snake River, Wawawai, Washington (St. John).

14. *ALLENRÓLFEA* Kuntze, Rev. Gen. Pl. 2: 545. 1891.

Much branched glabrous and succulent shrub or suffrutescent perennial with alternate articulate branches. Leaves reduced to short scales. Flowers perfect, spirally arranged

by 3's or 5's in the axils, fleshy peltate bracts forming dense cylindric spikes. Perianth small, angled, truncate at apex or 4-5-lobed, narrowed to the base, similar in fruit. Stamens 1 or 2; exserted. Stigmas 2 or rarely 3, short, usually distinct. Utricle ovoid, compressed, with a free membranous pericarp. Seed erect, oblong, smooth; embryo partly enclosing the copious endosperm; radicle inferior. [Name in honor of Allen Rolfe, English botanist.]

A monotypic genus of western North America.

1. *Allenrolfea occidentalis* (S. Wats.) Kuntze. Iodine Bush. Fig. 1543.

Halostachys occidentalis S. Wats. Bot. King Expl. 293. 1871.

Spirostachys occidentalis S. Wats. Proc. Amer. Acad. 9: 125. 1874.

Allenrolfea occidentalis Kuntze, Rev. Gen. Pl. 2: 545. 1891.

Salicornia occidentalis Greene, Fl. Fran. 173. 1891.

Erect shrub or half-shrub, 5-20 dm. high, woody below or nearly throughout, the younger branches fleshy, more or less glaucous, 1-3 mm. thick, their joints 2-10 mm. long. Leaves small, scale-like, broadly triangular, acute or acutish, early deciduous or obsolete; spikes numerous, 5-25 mm. long; calyx closely enclosing the utricle in fruit; seed about 0.6 mm. long, brown.

Alkaline soils, Sonoran Zones; San Joaquin Valley and Inyo County, California, south through the desert regions to northern Lower California, east to Utah, Texas, and Sonora. Type locality: about Great Salt Lake, Utah. June-Aug.

15. *SALICORNIA* L. Sp. Pl. 3. 1753.

Annual or perennial herbs or often suffrutescent, the branches numerous, fleshy, opposite and pointed, with short internodes. Leaves opposite, reduced and scale-like. Flowers perfect or polygamo-dioecious, in cylindric fleshy spikes, made up of very short internodes, with the flowers sunk in groups of 3-7 on opposite sides of the joints. Calyx fleshy, with a truncate or 3-4-toothed margin. Stamens 2, rarely 1; anthers exserted on short slender or subulate filaments. Utricle oblong or ovoid, included in the spongy calyx. Seeds erect; endosperm none; embryo conduplicate, the radicle inferior. [Name Greek, meaning salt-horn, from the saline habitat and the horn-like branches.]

About 10 species, of world-wide distribution and inhabiting moist saline or alkaline soils. Type species, *Salicornia europaea* L.

Perennials with creeping rootstocks.

Spikes broader than the stems; seeds glabrous.

Spikes slender, not broader than the stems; seeds pubescent.

Annuals.

Plants erect, usually simple at the base, the branches ascending.

Bracts mucronate; spikes 4-6 mm. thick.

Bracts rounded or acutish, not mucronate; spikes 1.5-4 mm. thick.

Plants with the lower branches elongated and prostrate.

1. *S. subterminalis*.

2. *S. ambigua*.

3. *S. Bigelovii*.

4. *S. europaea*.

5. *S. depressa*.

1. *Salicornia subterminalis* Parish. Parish's Glasswort. Fig. 1544.

Salicornia subterminalis Parish, Erythea 6: 87. 1898.

Arthocnemum subterminale Standley, Journ. Wash. Acad. 4: 399. 1914.

Perennial, the principal branches somewhat woody, decumbent, 2-5 dm. long, the secondary branches ascending or erect, 2-3 dm. high. Branchlets numerous and crowded, slender, 2-3 mm. in diameter, the joints 5-15 mm. long, terminating in a truncate or bilobate sheath; the flowering joints occurring on the lower part of the branchlets or usually subterminal, 1.5-5 cm. long, a little thicker than the branchlets; the joints shorter than thick; flowers subequal; achenes glabrous.

Salt marshes along the coast; Sonoran and Tropical Zones; San Francisco Bay, California, to Sinaloa, Mexico. In southern California occasionally in alkaline soils of the interior valleys. Type locality: San Jacinto River, Riverside County, California. April-Sept.

2. *Salicornia ambigua* Michx. Woody Glasswort, Pickleweed. Fig. 1545.

Salicornia ambigua Michx. Fl. Bor. Amer. 1: 2. 1803.

Salicornia pacifica Standley, N. Amer. Fl. 21: 83. 1916.

Perennial, the stems several, suffrutescent at base, 2-6 dm. long, decumbent, not rooting or prostrate, the branches stout, erect or ascending, their joints 6-20 mm. long, 2-4.5 mm. thick. Sheaths rounded or with acutish lobes; flowering spikes 15-40 mm. long, about 3 mm. thick, the central flower but little higher than the two lateral ones; utricle brown, covered with short slender curved hairs.

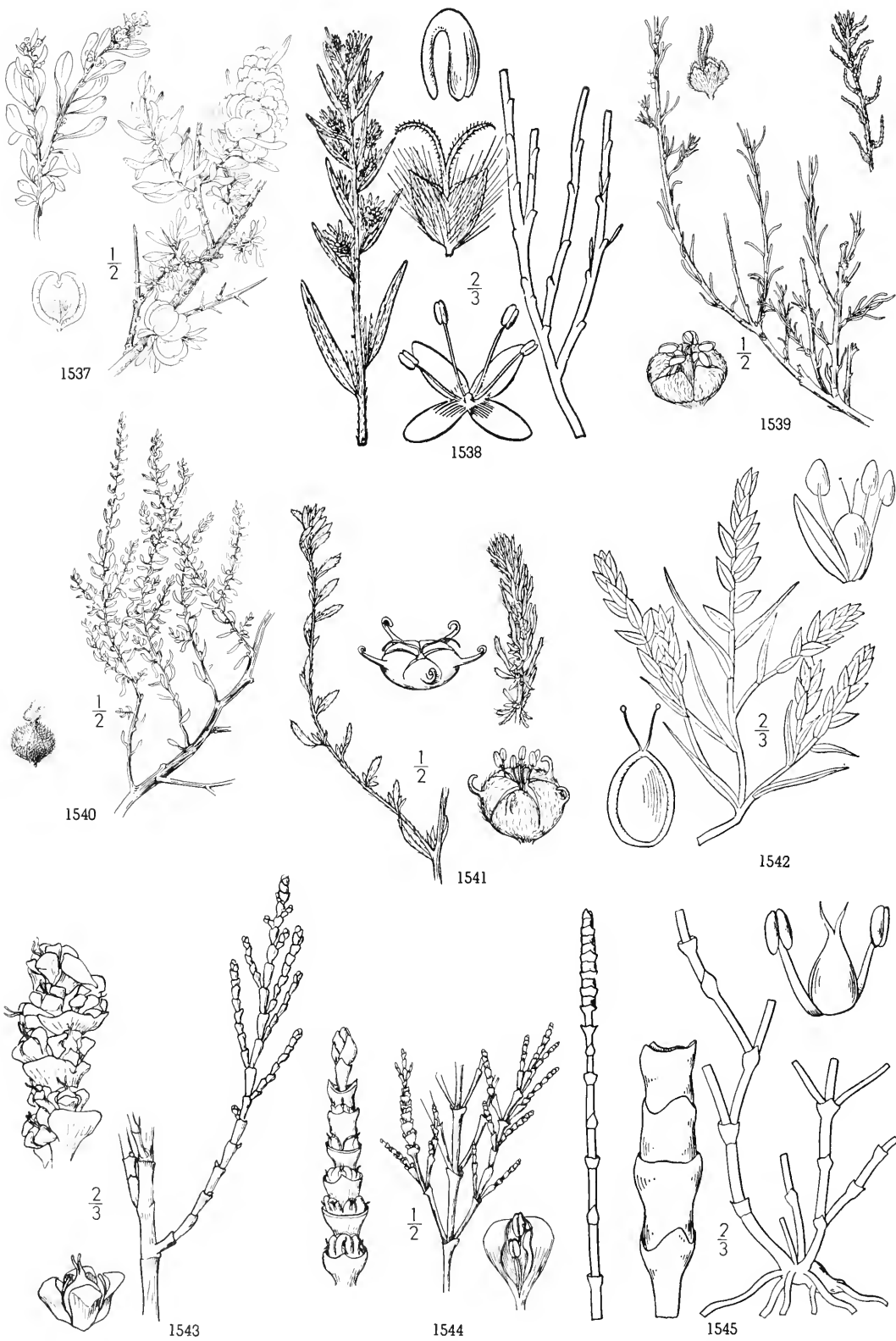
Salt marshes along the coast, and in the interior valleys, Boreal and Austral Zones; extending from British Columbia to Sonora; also on the Atlantic Coast. Type locality: "Carolina." Aug.-Oct.

3. *Salicornia Bigelovii* Torr. Bigelow's Glasswort. Fig. 1546.

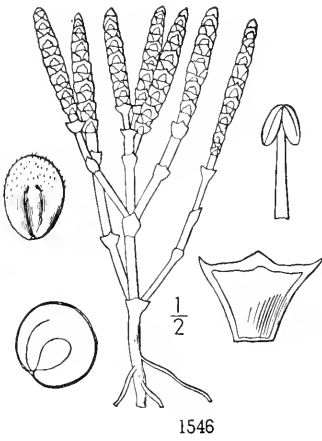
Salicornia mucronata Bigelow, Fl. Bost. ed. 2. 2. 1824. Not Lag. 1817.

Salicornia Bigelovii Torr. Bot. Mex. Bound. 184. 1859.

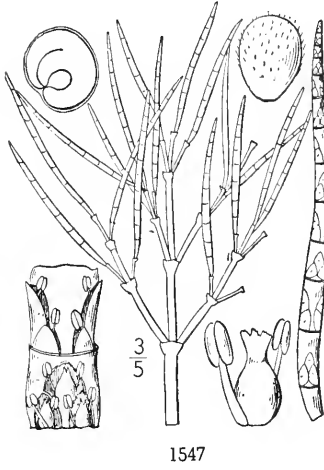
Annual, the stem erect, with few to many erect branches above the usually simple base,



1537. *Grayia spinosa*
1538. *Eurotia lanata*
1539. *Kochia americana*
1540. *Kochia californica*
1541. *Echinopsilon hyssopifolium*
1542. *Corispermum hyssopifolium*
1543. *Allenrolfea occidentalis*
1544. *Salicornia subterminalis*
1545. *Salicornia ambigua*



1546



1547



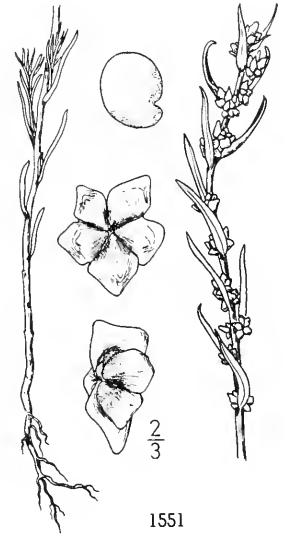
1548



1549



1550



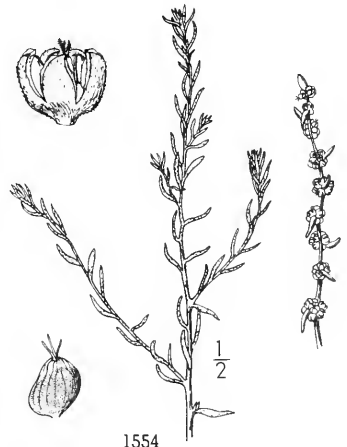
1551



1552



1553



1554

1546. *Salicornia Bigelovii*
1547. *Salicornia europaea*
1548. *Salicornia depressa*

1549. *Sarcobatus vermiculatus*
1550. *Suaeda depressa*
1551. *Suaeda occidentalis*

1552. *Suaeda nigra*
1553. *Suaeda Torreyana*
1554. *Suaeda ramosissima*

5–30 cm. high, the joints 2–3 mm. thick. Scales triangular-ovate, sharply mucronate; flowering spikes 1–5 cm. long, 4–6 mm. thick, the joints as thick or thicker than long; central flower slightly higher than the lateral ones, reaching nearly to the end of the joint; utricle pubescent with short curved hairs.

Salt marshes along the coast; San Diego, California; also on the Atlantic Coast. Type locality: salt marshes, vicinity of Boston, Massachusetts. Aug.–Nov.

4. *Salicornia europaea* L. Slender Glasswort. Fig. 1547.

Salicornia europaea L. Sp. Pl. 3. 1753.

S. europaea var. *herbacea* L. loc. cit.

Salicornia herbacea L. Sp. Pl. ed. 2. 5. 1762.

Salicornia rubra A. Nels. Bull. Torrey Club 26: 122. 1899.

An erect annual, the stem usually simple at base, much branched above, 5–45 cm. high, the joints slender, 1–2.5 mm. thick, often turning reddish in age; flowering spikes 2.5–6 cm. long, 1.5–3 mm. thick, tapering above, longer than thick; central flower higher than the two lateral ones, reaching nearly to the end of the joint; utricle pubescent with curved hairs.

Salt marshes and alkaline flats, Boreal and Austral Zones; in the Pacific States occurring in Modoc County, and Tehachapi Valley, California, ranging from western Nevada to the Great Plains; also on the coast of Alaska and British Columbia, the northern Atlantic Coast and the Old World. Type locality: seashores of Europe. July–Oct. The plants of the Great Basin and Great Plains regions are considered distinct by some botanists.

5. *Salicornia depréssa* Standley. San Diego Glasswort. Fig. 1548.

Salicornia depressa Standley, N. Amer. Fl. 21: 85. 1916.

Annual, prostrate and densely branched, the main branches 5–15 cm. long, the lateral branches widely spreading and rigid, their joints about 2 mm. thick. Scales rounded or acutish; flowering spikes 2–2.5 mm. thick and 15–45 mm. long; the middle flower almost entirely above the lateral ones; utricle pubescent with short hairs.

Salt marshes along the coast, Sonoran Zones; San Diego, California, southward into Lower California. Type locality: San Diego, California. Aug.–Nov.

16. *SARCOBATUS* Nees in Max. Reise N. Amer. 1: 510. 1839.

Much branched monoecious or dioecious shrubs, with spinescent branches. Leaves alternate or opposite, sessile, linear, fleshy. Staminate flowers spirally arranged in slender peduncled ament-like spikes, without perianth; stamens 2–3, covered by a peltate stipitate scarious scale. Pistillate flowers sessile, 1 or 2 in the axils of the leaves; calyx compressed, ovoid or oblong, adnate to the base of the 2 subulate recurved stigmas. Fruit coriaceous with a broad scarious horizontal crenulate wing near the middle, the lower part turbinate, the upper conical. Seed erect, orbicular; embryo spirally coiled; endosperm none. [Name Greek, meaning flesh-thorn, in reference to the fleshy leaves and thorny stems.]

One or possibly two species, natives of western North America. Type species, *Sarcobatus Maximilianii* Nees.

1. *Sarcobatus vermiculatus* (Hook.) Torr. Greasewood. Fig. 1549.

Batis vermiculatus Hook. Fl. Bor. Amer. 2: 128. 1838.

Sarcobatus Maximilianii Nees in Max. Reise N. Amer. 1: 510. 1839.

Fremontia vermicularis Torr. in Frem. Rep. 91. 1843.

Sarcobatus vermiculatus Torr. in Emory, Notes Mil. Rec. 150. 1848.

Shrub 5–30 dm. high, the branches stout, stramineous, the older ones with grayish bark and yellow wood, the branchlets spreading or ascending, becoming rigid and spinescent. Leaves narrowly linear, 15–40 mm. long, obtuse or acutish at apex, narrowed at base, glabrous or sparsely stellate-puberulent when young; staminate spikes cylindric, 6–20 mm. long, 3–4 mm. in diameter; wing of the fruiting calyx 8–12 mm. broad, prominently veined, glabrous or sparsely stellate-puberulent.

Alkaline soils, Sonoran Zones; in the Pacific States occurring east of the Cascade-Sierra Divide from eastern Washington to southern California, and extending eastward to Alberta, North Dakota, and New Mexico. June–Aug.

Sarcobatus Baileyi Coville, Proc. Biol. Soc. Wash. 7: 77. 1892. Branchlets, leaves, and fruits minutely pubescent or finally glabrate. This species is probably best considered as a mere form of the preceding from which it does not seem possible to distinguish it by any constant characters. The range extends from the southern California deserts and Nevada to southern Colorado.

17. *SUAEDA* Forsk. Fl. Aegypt. 69. 1775.

Annual or perennial herbs, or shrubs, more or less fleshy. Leaves alternate, narrow and often terete. Flowers perfect or polygamous, clustered in the upper axils or sometimes solitary, bracteate. Calyx 5-parted or 5-cleft, the lobes narrow, keeled or narrowly winged on the back in age. Stamens 5, with short filaments. Ovary subglobose or depressed; styles usually 2. Utricle enclosed by the infolding sepals; seed horizontal or vertical; endosperm none or scanty; embryo coiled into a flat spiral. [Name Arabic.]

About 50 species, of wide geographical distribution. Type species, *Suaeda vera* Forsk. *Dondia* Adans. (1763) has priority, but the name *Suaeda* has been conserved by the International Rules of Nomenclature.

Calyx-lobes corniculately appendaged or transversely winged; annuals.

Calyx-lobes corniculately appendaged; leaves broadest at base, the upper decidedly so. 1. *S. depressa*.
Calyx-lobes transversely winged, the wings more or less lobed; leaves not broader at the base, the uppermost somewhat so. 2. *S. occidentalis*.

Calyx-lobes neither appendaged nor winged.

Annuals; stems erect, slender. 3. *S. nigra*.

Perennials, often suffrutescent at the base.

Leaves strongly flattened; branches of the inflorescence very slender.

Stems and leaves glabrous. 4. *S. Torreyana*.

Stems and leaves pubescent. 5. *S. ramosissima*.

Leaves subterete.

Stems and leaves glabrous.

Leaves of the inflorescence not crowded; seeds about 0.8 mm. broad. 6. *S. fruticosa*.

Leaves of the inflorescence crowded; seeds 1.5–2 mm. broad. 7. *S. californica*.

Stems and leaves pubescent. 8. *S. taxifolia*.

1. *Suaeda depressa* (Pursh) S. Wats. Pursh's Sea-blite. Fig. 1550.

Salsola depressa Pursh, Fl. Amer. Sept. 197. 1814.

Suaeda depressa S. Wats. Bot. King Expl. 294. 1871.

Suaeda minutiflora S. Wats. Proc. Amer. Acad. 18: 194. 1883.

Dondia depressa Britton in Britt. & Brown, Ill. Fl. 1: 585. 1896.

Annual or rarely a short-lived herbaceous perennial, branched from the base, the branches stout, more or less decumbent, 2–5 dm. long, glabrous, usually crowded, erect or ascending. Leaves narrowly linear, semi-terete, broadest at base, 10–25 mm. long, glabrous, those of the inflorescence shorter and ovate-lanceolate; calyx-lobes acute or obtuse, one or more corniculate-appendaged; seeds 1 mm. broad, black.

Alkaline soils, Sonoran Zones; eastern Washington and Saskatchewan to coastal southern California, Nevada, and western Texas. Type locality: volcanic plains of the Missouri River. July–Sept.

Suaeda depressa var. *erecta* S. Wats. Proc. Amer. Acad. 9: 90. 1874. Annual, the stems strictly erect and simple, or simple below and sparingly branched above; flowers and seeds essentially the same as the typical species. Alkaline soils, Pacific States and Great Basin region. The southern California plants (*S. minutiflora* S. Wats.) seem intermediate.

2. *Suaeda occidentalis* S. Wats. Western Sea-blite. Fig. 1551.

Suaeda occidentalis S. Wats. Proc. Amer. Acad. 9: 90. 1870.

Dondia occidentalis Heller, Cat. N. Amer. Pl. 3. 1898.

Annual, glabrous and green or slightly glaucous, erect or spreading, simple or branched, the branches slender, flexuous. Leaves narrowly linear, not widened at the base, mostly spreading, 10–15 mm. long, 1 mm. wide, those of the inflorescence but little reduced and only slightly broader at the base; calyx-lobes obtuse, transversely winged in age, the wings lobed; seeds 1 mm. broad, black, shining.

Alkaline soils, Upper Sonoran Zone; eastern Washington and eastern Oregon to southern Wyoming, Colorado and northern Nevada. Type locality: dry alkaline valley, Ruby Valley, Nevada. July–Sept.

3. *Suaeda nigra* (Raf.) J. F. Macbride. Black Sea-blite. Fig. 1552.

Chenopodium nigrum Raf. Atl. Journ. 146. 1832.

Suaeda diffusa S. Wats. Proc. Amer. Acad. 9: 88. 1874.

Dondia diffusa Heller, Cat. N. Amer. Pl. 3. 1898.

Dondia nigra Standley, N. Amer. Fl. 21: 89. 1916.

Suaeda nigra J. F. Macbride, Contr. Gray Herb. II. no. 56: 50. 1918.

Annual or rarely perennial, erect, simple or branched, 2–8 dm. high, glabrous and green or somewhat glaucous, the branches slender, ascending or spreading and usually flexuous. Leaves narrowly linear, usually distinctly narrowed at the base, 6–25 mm. long, those of the inflorescence reduced; flower clusters not crowded; calyx-lobes rounded on the back; seeds 1 mm. broad, black.

Alkaline soils, Upper Sonoran Zone; eastern Oregon and Idaho, south through the Great Basin region to northern Mexico. Type locality: upper part of the Canadian River, New Mexico. July–Sept.

4. *Suaeda Torreyana* S. Wats. Torrey's Sea-blite. Fig. 1553.

Suaeda Torreyana S. Wats. Proc. Amer. Acad. 9: 88. 1874.

Dondia Torreyana Standley, N. Amer. Fl. 21: 90. 1916.

An erect, green and essentially glabrous perennial, 3–8 dm. high, the branches usually very slender, ascending or more or less spreading, sparsely leafy. Leaves linear, 15–30 mm. long, strongly flattened, those of the inflorescence much reduced; flowers 1–4 in the axils, the clusters distant; calyx-lobes obtuse, rounded on the back; seeds 1–1.5 mm. broad, minutely tuberculate.

Alkaline soils, Sonoran Zones; eastern Oregon to Inyo County, California, southern Wyoming and New Mexico. Type locality: mountains on the west shore of Great Salt Lake, Utah. May–Sept. Inkweed, Iodine Weed.

5. *Suaeda ramosissima* (Standley) Johnston. Salton Sea-blite. Fig. 1554.

Dondia ramosissima Standley, N. Amer. Fl. 21: 91. 1916.

Suaeda ramosissima Johnston, Proc. Calif. Acad. IV. 12: 1017. 1924.

Suaeda Torreyana var. *ramosissima* Munz, Man. S. Calif. 144. 1935.

An erect perennial, woody at base, 5–10 dm. high, finely and rather densely pubescent through-

out, the branches slender, usually widely divergent. Leaves strongly flattened, linear, 5–20 mm. long; flowers 1–4 in the axils, the clusters not crowded; calyx-lobes obtuse or acutish; seeds 1 mm. broad, dark brown.

Alkaline soils, Lower Sonoran Zone; southeastern California to western Arizona and adjacent Lower California. Type locality: Lee's Ferry, Arizona, July–Oct. Typical *Suaeda suffrutescens* S. Wats., to which these plants have been referred by some authors, is confined to New Mexico and Texas.

6. *Suaeda fruticosa* (L.) Forsk. Shrubby Sea-blite. Fig. 1555.

Chenopodium fruticosum L. Sp. Pl. 221. 1753.

Suaeda fruticosa Forsk. Fl. Aegypt. 70. 1775.

Suaeda intermedia S. Wats. Proc. Amer. Acad. 14: 296. 1879.

Suaeda fruticosa var. *multiflora* Torr. Pacif. R. Rep. 4: 13. 1857.

Suaeda Moquinii Greene, Pittonia 1: 264. 1889.

Erect or ascending glabrous perennial, woody at base, 3–8 dm. high, the branches numerous, slender or stout, usually ascending. Leaves numerous, narrowly linear, 10–25 mm. long, subterete, spreading or ascending, those of the inflorescence but little reduced; calyx deeply cleft, the lobes acute or obtuse, rounded on the back; seeds 0.8 mm. broad, black and shining.

Alkaline and saline soils, Sonoran Zones; eastern Oregon to the coastal region of southern California, eastward to Alberta and northern Mexico; also in the West Indies, Eurasia, and Africa. Type locality: seacoast of France. July–Oct.

7. *Suaeda californica* S. Wats. California Sea-blite. Fig. 1556.

Suaeda californica S. Wats. Proc. Amer. Acad. 9: 89. 1874.

Dondia californica Heller, Cat. N. Amer. Pl. 3. 1898.

Glabrous or very slightly villous perennial, with decumbent or ascending stems, 2–8 dm. long, woody below, the branches stout, densely leafy. Leaves narrowly linear, 15–35 mm. long, ascending or erect, subterete, acute or acuminate, those of the inflorescence usually crowded and but little reduced; flowers 1 or 2 in the axils; calyx-lobes rounded on the back, glaucous; seed 1.5–2 mm. broad, black, shining.

Salt marshes along the coast, Sonoran Zones; San Francisco Bay, California, to northern Lower California. Type locality: salt marshes of San Francisco Bay. July–Oct.

8. *Suaeda taxifolia* Standley. Woolly Sea-blite. Fig. 1557.

Suaeda californica var. *pubescens* Jepson, Fl. Calif. 447. 1914.

Dondia taxifolia Standley, N. Amer. Fl. 21: 91. 1916.

Suaeda taxifolia Standley, Field Mus. Bot. Ser. 8: 10. 1930.

Much branched perennial, densely tomentulose or short-villous throughout; the branches very stout, ascending or decumbent, 2–10 dm. long, densely leafy. Leaves narrowly linear, 10–25 mm. long, ascending or spreading, acute or acuminate, terete, those of the inflorescence crowded and little reduced; flowers 1–4 in the axils, 2.5–3 mm. broad; calyx densely pubescent, lobes rounded on the back; seed 1.5–2 mm. broad, black.

Salt marshes along the coast, Sonoran Zones; southern California from Santa Barbara County to Los Angeles County. Type locality: in salt marshes, Playa del Rey. July–Nov.

Suaeda taxifolia subsp. *brevifolia* (Standley) Abrams comb. nov. (*Dondia brevifolia* Standley, N. Amer. Fl. 21: 92. 1916.) This subspecies differs from the typical species in the shorter leaves (3–8 mm.) and the smaller flowers, 1–1.5 mm. broad. Salt marshes along the coast, Sonoran Zones; Orange County, California, to Lower California. Type locality: Newport, California.

18. *SALSOLA* L. Sp. Pl. 222. 1753.

Annual or perennial herbs with erect bushy-branched stems, and mostly alternate, rigid subulate pungent leaves. Flowers perfect, sessile, solitary or fascicled in the axils, 2-bracteolate. Calyx 5-parted, its lobes appendaged by a broad membranous horizontal wing in fruit. Stamens 5 or sometimes fewer. Stigmas 2 or 3, subulate; ovary depressed. Utricle flattened, included in the calyx. Seed horizontal, orbicular; embryo spirally coiled; endosperm none. [Name Latin, a diminutive of *salsus*, salty.]

A genus of about 50 species of wide geographic distribution. Type species, *Salsola Soda* L.

1. *Salsola Kàli* var. *tenuifolia* Tausch. Russian Thistle. Fig. 1558.

Salsola Kali var. *tenuifolia* Tausch, Flora 11: 326. 1828.

Salsola pestifer A. Nelson, in Coult. & Nels. Man. Bot. Rocky Mts. 169. 1909.

Much branched annual forming dense brushy clumps, the stems slender or stout, the branches glabrous or sometimes scabrous or pubescent. Leaves slender, nearly filiform, the lower 3–6 cm. long, pungent, glabrous or minutely scabrous, green or glaucous, the upper shorter and broader, somewhat indurate in age; fruiting calyx 3–6 mm. broad, the wings membranous, conspicuously veined and usually reddish, or the lowermost flowers sometimes merely carinate or with very narrow veinless wings; seed black and shining, 1.5–2 mm. broad.

In cultivated fields and waste places; becoming a troublesome weed in the Pacific States, especially in the dry interior parts. Naturalized from Eurasia. July–Oct



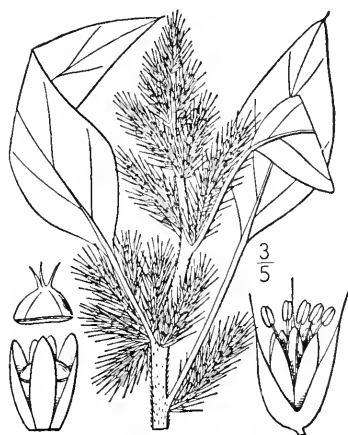
1555



1556



1558



1559



1560



1557



1561



1562



1563

1555. *Suaeda fruticosa*
1556. *Suaeda californica*
1557. *Suaeda taxifolia*

1558. *Salsola Kali*
1559. *Amaranthus retroflexus*
1560. *Amaranthus hybridus*

1561. *Amaranthus graecizans*
1562. *Amaranthus blitoides*
1563. *Amaranthus californicus*

Family 37. **AMARANTHACEAE.****AMARANTH FAMILY.**

Herbs or shrubs, or some tropical species trees, with opposite or alternate usually entire leaves and no stipules. Flowers solitary, racemose, spicate or capitate, perfect, polygamous or dioecious, each (or rarely each cluster of 2-5) subtended by a bract and two bractlets, these usually hyaline, never foliaceous. Calyx rarely wanting, the segments 5 or rarely 1-4, free or united at base, equal or the inner often shorter, usually scarious or chartaceous, rarely herbaceous. Corolla wanting. Stamens opposite the calyx-segments and of the same number, fewer or rarely more numerous; filaments free or united below into a tube; anthers dorsi-fixed, 1-2-celled. Ovary superior, 1-celled; stigmas 2 or 3; ovules solitary (numerous in some tropical species), amphitropous. Fruit a utricle, circumscissile, irregularly dehiscent, or indehiscent. Seeds erect or inverted, often shiny, naked or arillate; endosperm copious.

A family of about 55 genera and 500 species, most abundant in tropical regions.

Leaves alternate; plants not white-tomentose, annuals; filaments distinct; anthers 2-celled. 1. *Amaranthus*.
Leaves opposite; our species perennial and white-tomentose; filaments connate at base; anthers 1-celled.

2. *Tidestromia*.

1. AMARANTHUS L. Sp. Pl. 989. 1753.

Annual herbs, with alternate petioled, undulate or crisped leaves. Flowers glomerate, the glomerules axillary, spicate or paniculate, polygamous, monoecious or dioecious. Sepals 2-5, distinct. Stamens usually of the same number as the sepals; filaments distinct; anther 2-celled. Utricle dehiscent or indehiscent; seed solitary, erect, smooth and lustrous, compressed. [Name Greek, meaning unfading flower.]

About 50 species, native of tropical and warm temperate regions. Type species, *Amaranthus caudatus* L.

Utricle circumscissile.

Sepals of the pistillate flowers oblong to lanceolate, usually narrowed above.

Flowers, at least the upper, in simple or paniculate spikes.

Spikes thick, simple or usually crowded in a stiff glomerate panicle.

Spikes slender-cylindric, flexuous, usually in ample panicles.

Flowers in axillary glomerules.

Plants erect, bushy-branched; utricle wrinkled.

Plants prostrate.

Sepals of the pistillate flowers 4 or 5, 2.5-3 mm. long.

Sepals of the pistillate flowers 1-3, one narrowly lanceolate, the others reduced and scale-like, or wanting.

Sepals of the pistillate flowers spatulate.

Flowers dioecious; sepals of the pistillate flowers not fimbriate.

Flowers monoecious; sepals of pistillate flowers fimbriate.

Utricle indehiscent, slightly fleshy, 3-5-nerved.

1. *A. retroflexus*.

2. *A. hybridus*.

3. *A. graecizans*.

4. *A. blitoides*.

reduced and scale-like,
5. *A. californicus*.

6. *A. Palmeri*.

7. *A. fimbriata*.

8. *A. deflexus*.

1. *Amaranthus retroflexus* L. Rough Pigweed, Green Amaranth. Fig. 1559.

Amaranthus retroflexus L. Sp. Pl. 991. 1753.

Amaranthus Powellii S. Wats. Proc. Amer. Acad. 10: 347. 1875.

Stems stout, erect, simple or usually branched, 3-15 dm. high, roughish-puberulent below and more or less villous-pubescent above. Leaves long-petioled, ovate or rhombic-ovate, undulate, somewhat pubescent at least on the veins beneath, dull green; spikes thick, usually 8-15 mm. thick, crowded into a stiffly erect glomerate panicle; bracts attenuate into a rigid spinose tip; sepals distinctly shorter than the bracts, lanceolate-oblong, acute or obtuse and spinulose-tipped; stamens 3 or 5; utricle rugulose above; seed compressed, rounded or obovate, black and shining.

Waste places, cultivated fields and gardens, Sonoran and Transition Zones; throughout the Pacific States and across the continent. Native of tropical America. Also known as Red Root. June-Dec.

2. *Amaranthus hybridus* L. Spleen Amaranth, Slender Pigweed. Fig. 1560.

Amaranthus hybridus L. Sp. Pl. 990. 1753.

Amaranthus hypochondriacus L. Sp. Pl. 991. 1753.

Amaranthus chlorostachys Willd. Amaranth. 34. 1790.

Closely resembling the preceding species, the stems more slender, 5-15 dm. high, smooth or pubescent. Leaves darker green; spikes slender, simple or more or less densely paniculate, spreading or drooping; bracts long-awned; sepals 5, oblong, acute and cuspidate; utricle nearly smooth; seeds rounded, black and shining.

Waste places and cultivated ground, Sonoran and Transition Zones; geographical range about the same as that of the preceding species, but less common in the Pacific States. The foliage and inflorescence sometimes tinged with red. June-Dec.

Amaranthus cruentus L. Syst. ed. 10. 1269. 1759. This Chinese ornamental plant is an occasional escape in Washington (*St. John*). Differs from *A. retroflexus* mainly in purple instead of green inflorescence and in smaller sepals (1.5 mm. long).

2. *Amaranthus graecizans* L. Tumbleweed. Fig. 1561.

Amaranthus graecizans L. Sp. Pl. 990. 1753.

Amaranthus albus L. Sp. Pl. ed. 2. 1404. 1763.

Stems erect, bushy-branched, 2-6 dm. high, glabrous and pallid. Leaves oblong, spatulate or obovate, 2-4 cm. long, slender-petioled, papillose; flower polygamous, in small axillary clusters; bracts subulate, spine-tipped, much longer than the 3 membranous sepals; stamens 3; utricle rugulose above; seeds about 0.7 mm. in diameter.

A common summer weed in waste and cultivated ground, Sonoran and Transition Zones; common in the Pacific States and throughout the United States and Canada. Native of tropical America. In the fall leafless, rigid bushy stems are easily uprooted and blown about by the wind, thus effectively sowing the ripened seeds and widely disseminating the species. June-Oct.

4. *Amaranthus blitoides* S. Wats. Prostrate Amaranth. Fig. 1562.

Amaranthus blitoides S. Wats. Proc. Amer. Acad. 12: 273. 1877.

Galliardia blitoides Nieuwl. Amer. Midl. Nat. 3: 278. 1914.

Amaranthus blitoides var. *crassior* Jepson, Fl. Calif. 449. 1914.

Stems somewhat succulent, prostrate, 3-6 dm. long, whitish. Leaves obovate to oval, 1-4 cm. long, glabrous, usually crowded, deep green and shining, often white-margined; flowers monoecious, in small axillary clusters; bracts oblong to lanceolate, longer than the sepals, attenuate to a spinose tip; sepals of the pistillate flowers 4 or 5, narrowly oblong, 3 mm. long, acuminate; stamens 3; utricle smooth; seed rotund, 1.5 mm. in diameter, rather dull black.

Dry ground, roadsides and cultivated fields, Sonoran and Transition Zones; Washington to southern California, Wyoming, western Texas, and Chihuahua; introduced in the eastern United States, and apparently in California west of the Sierra Nevada. Type locality: not definitely stated. July-Nov.

5. *Amaranthus californicus* (Moq.) S. Wats. California Amaranth. Fig. 1563.

Mengea californica Moq. in DC. Prod. 13²: 270. 1849.

Amaranthus californicus S. Wats. Bot. Calif. 2: 42. 1880.

Amaranthus carneus Greene, Pittonia 2: 105. 1890.

Amaranthus albomarginatus Uline & Bray, Bot. Gaz. 19: 318. 1894.

Stems prostrate, much branched, forming mats 8-50 cm. across, whitish and glabrous. Leaves spatulate or obovate to oblanceolate, 5-20 mm. long, pale green and glabrous, often white-margined; petioles slender, as long or longer than the blades; flowers monoecious, in small axillary clusters; bracts lanceolate, subulate-tipped, about equaling the calyx; sepals of the staminate flowers usually 3, lanceolate; stamens 1 or 2; pistillate sepals 1-3, one narrowly lanceolate, the others much reduced and scale-like or wanting; utricle smooth; seeds rotund, 0.6-0.8 mm. in diameter.

Sandy moist flats, mainly in the Transition Zone; southern Washington and Alberta to Nevada and southern California. Type locality: California. July-Oct.

6. *Amaranthus Palmeri* S. Wats. Palmer's Amaranth. Fig. 1564.

Amaranthus Palmeri S. Wats. Proc. Amer. Acad. 12: 274. 1876.

Amaranthus Palmeri var. *glomeratus* Uline & Bray, Bot. Gaz. 19: 272. 1894.

Stems erect, stout, simple or usually branched, 3-10 dm. high, glabrous throughout or more or less pubescent above. Leaves ovate, rhombic-ovate or the upper lanceolate, 1-5 cm. long; petioles slender, usually much longer than the blades; inflorescence spike-like, simple or paniculate, often 3 dm. long or more, usually interrupted below; flowers dioecious; bracts lanceolate-subulate and pungent, well exceeding the calyx; sepals of the staminate flowers oblong, acute, those of the pistillate spatulate, often emarginate; stamens 5; style branches 2 or rarely 3; utricle circumscissile, rugose above; seeds oval, 1.3 mm. long, dark reddish brown.

Bottom lands and cultivated fields, Sonoran Zones; deserts of southern California, to western Texas and central Mexico. Type locality: Larkin's Station, San Diego County, California. Careless Weed. July-Nov.

7. *Amaranthus fimbriatus* (Torr.) Benth. Fringed Amaranth. Fig. 1565.

Sarratia Berlandieri var. *fimbriata* Torr. Bot. Mex. Bound. 179. 1859.

Amblogyna fimbriata A. Gray, Proc. Amer. Acad. 5: 167. 1861.

Amaranthus fimbriatus Benth. ex S. Wats. Bot. Calif. 2: 42. 1880.

Stems erect, 1-8 dm. high, simple or usually branched, glabrous throughout or puberulent above. Leaves narrowly lanceolate to linear, 2-7 cm. long, green and glabrous; petioles slender, shorter than the blades; inflorescence spike-like, interrupted and leafy below; flowers monoecious; bracts distinctly shorter than the sepals, ovate, acute or acuminate, often fimbriate; sepals of the pistillate flowers united at the base, broadly spatulate and conspicuously fimbriate, those of the staminate flowers oblong, acute; stamens 3; utricle circumscissile near the apex; seeds rotund, 0.8 mm. in diameter.

Desert regions, Lower Sonoran Zone; southern Nevada and southern Utah to the Colorado Desert, California, Lower California and Sinaloa, Mexico. Type locality: on the Gila River, Arizona. Aug.-Dec.

8. *Amaranthus deflexus* L. Low Amaranth. Fig. 1566.

Amaranthus deflexus L. Mant. 2: 295. 1771.

Amaranthus prostratus Balbis, Mem. Acad. Turin. 7: 360. 1804.

Euxolus deflexus Raf. Fl. Tell. 3: 42. 1837.

Stems prostrate or ascending, branching from the base, slender, 2-5 dm. long, somewhat

succulent, green or slightly tinged with red-purple, glabrous or nearly so. Leaves rhombic-ovate to lanceolate, obtuse, 5–20 mm. long; petioles slender, equaling or longer than the blades, glabrous or pubescent; flowers polygamous, in dense, short and thick spikes, which are usually subtended by a few capitate axillary clusters; bracts inconspicuous, usually much shorter than the calyx; sepals 2 or 3, oblong, acutish; stamens 3; utricle exceeding the sepals, smooth, 3–5-nerved, smooth, indehiscent; seeds oval, 1 mm. long, dark reddish brown, shining.

Ballast at Portland, Oregon, and along streets and railroads in central and southern California; also adventive along the Atlantic Coast; Europe, Africa, and South America. May–Nov.

2. *TIDESTRÔMIA* Standley, Journ. Wash. Acad. 6: 70. 1916.

Annual or perennial herbs or suffruticose at base, canescent with branched hairs. Leaves opposite, with broad rounded entire blades and slender petioles. Flowers glomerate in the axils of the leaves, perfect, minute, subtended by a bract and 2 bractlets, these small, pubescent and hyaline; calyx 5-parted, sepals united at base, equal. Stamens 5, the filaments united below into a cup, with or without intervening staminodia; anthers 2-celled. Ovary globose; style short; stigma simple or 2-lobed; ovule solitary, pendent. Utricle slightly compressed, smooth and glabrous. [Name in honor of the contemporary American botanist, Ivar Tidestrom.]

A genus of 3 species, native of the arid southwestern United States and adjacent Mexico. Type species, *Achyranthes lanuginosa* Nutt.

1. *Tidestromia oblongifolia* (S. Wats.) Standley. Arizona Honey-sweet.

Fig. 1567.

Cladanthrix oblongifolia S. Wats. Proc. Amer. Acad. 17: 376. 1882.

Cladanthrix cryptantha S. Wats. Proc. Amer. Acad. 26: 125. 1891.

Tidestromia oblongifolia Standley. Journ. Wash. Acad. 6: 70. 1916.

Perennial from a stout woody taproot, the whole plant densely canescent with much-branched hairs; stems widely branching, spreading, more or less suffruticose at the base, 2–6 dm. long. Leaves broadly ovate to oblong, 1–4 cm. long, usually longer than the petioles; the small floral leaves united below, forming an involucre with an oblong-turbinate tube 2–3 mm. long and 3 broadly ovate lobes 2–4 mm. long; bractlets minute, much shorter than the calyx; sepals lanceolate, 1 mm. long; seeds 0.5 mm. long.

Dry sandy soils, Lower Sonoran Zone; deserts of southern California to southern Nevada and Arizona. Type locality: on the banks of the Colorado, near Chimney Peak, California. April–Dec.

Achyranthes repens L. Sp. Pl. 205. 1753. Prostrate perennial herb with villous foliage. Leaves rhombic-ovate, 5–15 cm. long; flowers in short spikes, sessile in the axils; bracts ovate, ciliate; sepals unequal, 3–5 mm. long, ovate, villous on the nerves. Sparingly adventive in southern California (Los Angeles, Oceanside), native of Mexico.

Family 38. NYCTAGINACEAE.*

FOUR-O'CLOCK FAMILY.

Herbs with fragile stems and tumid joints, and entire petiolate exstipulate mostly opposite leaves. Flowers perfect, with a calyx-like involucre or separate bracts. Calyx corolla-like, campanulate or salver-shaped, 4–5-lobed or 4–5-toothed, constricted above ovary. Petals wanting. Stamens hypogynous; filaments filiform; anthers 2-celled, dehiscent by lateral slits. Ovary superior, enclosed by the tube of the persistent calyx, 1-celled, 1-ovuled; style short or elongated; stigma capitate, depressed-capitate or linear. Fruit an anthocarp often costate or winged, enclosing the free achene. Embryo in ours curved, cotyledons enclosing the mealy or fleshy endosperm.

About 20 genera and 160 species, of warm temperate and tropical regions.

Flowers borne on nerves of large foliaceous bracts.

Flowers in calyx-like involucre or subtended by bracts shorter than the inflorescence.

Anthocarp lenticular with the margins revolute and usually dentate.

Anthocarp not lenticular.

Bracts united into an involucre.

Anthocarp definitely angled or ribbed; involucre accrescent.

Anthocarp smooth or nearly so; involucre but little changed in fruit.

Bracts free.

Stigma linear; perianth salverform.

Stigma peltate or capitate; perianth not salverform.

Perianth funnelform, 3–10 cm. or more long.

Perianth 3–4 cm. long; anthocarp conspicuously winged.

Perianth 10 or more cm. long, angled or sulcate.

Perianth campanulate or short-funnelform, 2–8 mm. long.

1. *Hermidium*.

5. *Allionia*.

6. *Oxybaphus*.

7. *Mirabilis*.

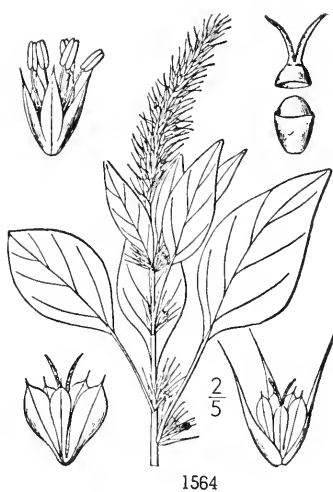
8. *Abronia*.

2. *Selinocarpus*.

3. *Acleisanthes*.

4. *Boerhaavia*.

* Text contributed by Roxana Stinchfield Ferris.



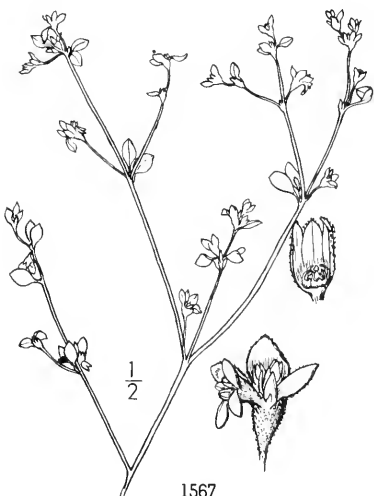
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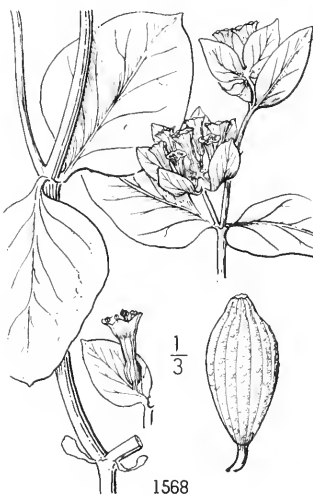
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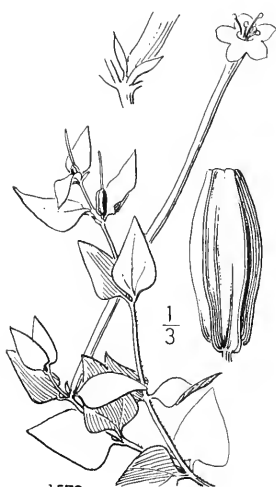
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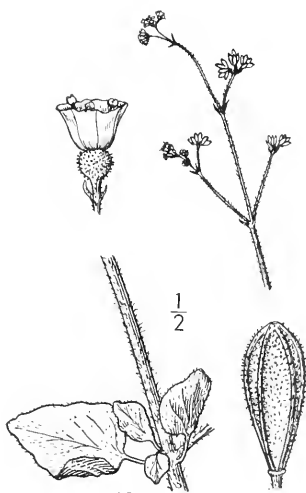
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1564. *Amaranthus Palmeri*
 1565. *Amaranthus fimbriatus*
 1566. *Amaranthus deflexus*

1567. *Tidestromia oblongifolia*
 1568. *Hermidium alipes*
 1569. *Selinocarpus diffusus*

1570. *Acleisanthes longiflora*
 1571. *Boerhaavia annulata*
 1572. *Boerhaavia coccinea*

1. *HERMÍDIUM* S. Wats. Bot. King Expl. 286. 1871.

Perennial herbs with erect, dichotomous branching stems and opposite, short-petiolate, entire leaves. Flowers in axillary or terminal head-like clusters, each sessile on the costa of a foliaceous bract. Perianth campanulate-funnelform; stamens 5-7; filaments unequal, united at the base. Ovary globose; style capillary, equaling the perianth; stigma capitate. Anthocarp ellipsoid; embryo curved, enclosing the endosperm; cotyledons orbicular, the inner smaller. [Name Greek, diminutive of Hermes.]

A monotypic genus of the Great Basin region. Type species, *Hermidium alipes* S. Wats.

1. *Hermidium alipes* S. Wats. Winged Hermidium. Fig. 1568.

Hermidium alipes S. Wats. Bot. King Expl. 286. pl. 32. 1871.

Plants 1.5-4 dm. high, glaucous throughout, glabrous or obscurely puberulent above, the stems few from a woody caudex, stout, curved. Leaves thick, petiole 1-10 mm. long, blade 2-7 cm. long, suborbicular to oval-ovate, apiculate or rounded at the apex; inflorescence 4-6-flowered; peduncles 3-12 mm. long; bracts oblong to ovate, 1-2 cm. long, rounded or subcordate at the base, usually slightly united; perianth purplish red, 2-2.5 cm. long; stamens about equaling the perianth; fruit 6-7 mm. long, a little narrowed at each end, surface smooth or obscurely roughened, 9-10-nerved.

Foothills, Upper Sonoran Zone; northern central Nevada, south to the Panamint and White Mountains, California, and east to Utah. Type locality: "From the Big Bend of the Truckee River to Oreana on the Humboldt," Nevada. May-June.

2. *SELINOCÁRPUS* A. Gray, Amer. Journ. Sci. II. 15: 262. 1853.

Dichotomously branching perennial herbs often shrubby at the base. Leaves opposite, petiolate, blade thick, the margins entire or sinuate. Flowers sessile or pedicellate, bracteate in few- to many-flowered clusters, axillary or at the ends of the branches. Perianth tubular-funnelform, not constricted above the ovary. Stamens 3-5. Anthocarp with 3-5 hyaline wings. [Name from the resemblance of the fruit to that of the genus *Selinus*.]

A genus of about 7 species occurring in southwestern United States and adjacent Mexico with one species reported from Africa. Type species, *Selinocarpus diffusus* A. Gray.

1. *Selinocarpus diffusus* A. Gray. Desert Wing-fruit. Fig. 1569.

Selinocarpus diffusus A. Gray, Amer. Journ. Sci. II. 15: 262. 1853.

Selinocarpus diffusus subsp. *nevadensis* Standley, Contr. U.S. Nat. Herb. 12: 388. 1909.

Diffusely branched perennial herb, 1-2 dm. high, more or less glandular-puberulent and very leafy throughout. Leaves ovate, acute or obtuse at the apex, the petiole equaling or exceeding the blade; flowers solitary or in 2's, often cleistogamous, the pedicels very short; subtending bracts subulate, 3-5 mm. long; perianth greenish, 3-4 cm. long; anthocarp 6-7 mm. long, 4-5-winged, truncate, the body puberulent.

In dry soil, Sonoran Zone; Utah and Nevada to the eastern edge of San Bernardino County, California, and east to Texas. Type locality: southwestern Texas. June-Sept.

3. *ACLEISÁNTHES* A. Gray, Amer. Journ. Sci. II. 15: 259. 1853.

Plants perennial, sometimes shrubby, with opposite, petiolate, entire leaves. Flowers white or purple tinged, subtended by 1-3 small bracts, axillary or terminal, solitary or occasionally in 2-3-flowered cymes. Perianth funnelform, with long tube and shallowly 5-lobed limb, constricted above the ovary. Stamens 2-5, unequal, exceeding the perianth-tube. Ovary ovoid or oblong; style exserted; stigma capitate. Anthocarp narrowly ellipsoid, 5-angled or -ribbed, the ribs sometimes ending in conspicuous glands. Embryo curved cotyledons enclosing the endosperm. [Name Greek, in allusion to the absence of an involucre.]

A genus of about 7 species, native of southwestern United States and Mexico.

1. *Acleisanthes longiflora* A. Gray. Yerba de la Rabia. Fig. 1570.

Acleisanthes longiflora A. Gray, Amer. Journ. Sci. II. 15: 261. 1853.

Plants decumbent or ascending from a woody root, the stems slender, puberulent above, glabrate below. Leaves thick, entire, sometimes with crisped margins, petioles 3-8 mm. long, the blades deltoid to rhombic-ovate or lanceolate, 1.5-4.5 cm. long; flowers mostly solitary, sessile; bracts subulate, 2-3 mm. long; perianth white tinged with purple, sparsely puberulent, 10-16 cm. long, the limb 1.5-2 cm. broad; anthocarp narrowly oblong, 5-6 mm. long, truncate at both ends, 5-angled, longitudinally striate between the ribs.

Not common, desert slopes, Lower Sonoran Zone; eastern borders of Riverside County, California, to southwestern Texas and Chihuahua and Coahuila, Mexico. Type locality: valley of the Limpio, Texas. May.

4. *BOERHAÀVIA* L. Sp. Pl. 3. 1753.

Annual or perennial herbs usually branching from the base, the stems usually with viscous areas on the internodes. Leaves opposite, petiolate. Flowers perfect, bracteate, the bracts mostly minute. Perianth funnelform, campanulate to rotate. Stamens 2-5,

the filaments unequal. Stigma peltate. Anthocarp obovoid or obpyramidal, costate, angulate or winged. Embryo curved; cotyledons enclosing the endosperm. [Name in honor of H. Boerhaave, Dutch botanist.]

A genus of some 30 species found in the tropics and warm temperate regions of both hemispheres. Type species, *Boerhaavia repens* L.

Anthocarp 10-nerved; perianth funnellform.

1. *B. annulata*.

Anthocarp 3-5-nerved or angled; perianth campanulate.

2. *B. coccinea*.

Perennials; anthocarp glandular-pubescent.

Annuals; anthocarp glabrous.

Ultimate branches of the inflorescence with flowers in umbel-like clusters or solitary on slender pedicels; bracts shorter than the mature fruit, usually deciduous; fruit obpyramidal.

Flowers in umbels; fruit narrowly obpyramidal.

3. *B. intermedia*.

Flowers mostly solitary on slender pedicels; fruit broadly obpyramidal.

4. *B. triquetra*.

Ultimate branches of the inflorescence with flowers in spikes; bracts as long as the mature fruit, persistent; fruit clavate.

5. *B. Wrightii*.

1. *Boerhaavia annulata* Coville. Death Valley *Boerhaavia*. Fig. 1571.

Boerhaavia annulata Coville, Contr. U.S. Nat. Herb. 4: 177. 1893.

Amulocaulis annulatus Standley, Contr. U.S. Nat. Herb. 12: 375. 1909.

Coarse biennials or perennials, 5-10 dm. high, the branches stout, few from the decumbent base, viscous areas on the internodes at regular intervals, stems glabrous. Leaves 3-10 cm. long, petioles 1-3 cm. long, oval to ovate-deltoid, irregularly repand-dentate, dark green above, pale beneath, reddish-veined, covered with long jointed white hairs with dark glandular bases; inflorescence leafless, flowers in dense head-like clusters; bracts short, persistent, covered with long white hairs; perianth 7-8 mm. long, greenish or pinkish, the tube pubescent without; stamens 3, long-exserted; fruit biturbinate, 10-11-ribbed, 4-5 mm. long.

Hot, dry canyons, Lower Sonoran Zone; Inyo County, California. Type locality: Furnace Creek Canyon, Death Valley region, California. April-May. Sticky-ring.

2. *Boerhaavia coccinea* Mill. Common or Red *Boerhaavia*. Fig. 1572.

Boerhaavia coccinea Mill. Gard. Dict. ed. 8. no. 4. 1768.

Boerhaavia caribaea Jacq. Obs. Bot. 4: 5. 1771.

Boerhaavia polymorpha Rich. Act. Soc. Hist. Nat. Paris 1: 185. 1792.

Boerhaavia hirsuta Willd. Phytog. 1: 1. 1794.

Boerhaavia viscosa Lag. & Rodr. Anal. Ci. Nat. Madrid 4: 256. 1801.

Boerhaavia sonorae Rose, Contr. U.S. Nat. Herb. 1: 110. 1891.

Boerhaavia ramulosa M. E. Jones, Contr. West. Bot. No. 10: 40. 1902.

Boerhaavia irodes Standley, Contr. U.S. Nat. Herb. 13: 423. 1911.

Decumbent or prostrate perennial, branching from the base, with many stout stems, 3-14 dm. long, viscid-pubescent and sometimes glandular-hirsute below, more or less glandular above. Leaves 2-6 cm. long, ovate-orbicular to oblong, rounded to acute at the apex, green above, pale below, with a brown-punctate margin, glabrous to hirsute, often viscid; inflorescence cymose, much branched, the branches slender, glandular-pubescent; flowers in heads on slender peduncles; bracts minute, lanceolate; perianth purplish red, 2 mm. long; stamens 1-3, barely exserted; fruit clavate, 2.5-3.5 mm. long, densely glandular-puberulent, 5-costate, the sulci smooth, broader than the ribs.

Sandy desert, Lower Sonoran and Tropical Zones; northern and western edge of the Colorado Desert, California, eastward to the Southern States, and south to the American tropics. Type locality: Jamaica. June-Sept.

3. *Boerhaavia intermedia* M. E. Jones. Jones' *Boerhaavia*. Fig. 1573.

Boerhaavia intermedia M. E. Jones, Contr. West. Bot. No. 10: 41. 1902.

Boerhaavia universitatis Standley, Contr. U.S. Nat. Herb. 12: 380. 1909.

Erect annual, 2-5 dm. high, branching from the base, the branches ascending, slender, minutely puberulent throughout. Leaves broadly oblong to ovate-lanceolate, obtuse or acute at the apex, 4-5 cm. long, 1-5 cm. broad, often brown-punctate, green above, pale beneath; inflorescence cymose, paniculate, flowers in umbel-like clusters at tips of the branches; bracts minute; perianth pink, 1.5-2 mm. long; stamens 2-3, mostly equaling the perianth; anthocarp obpyramidal, 2-2.7 mm. long, about 1 mm. broad at the apex, sharply 5-angled, the sulci narrow, rugose.

Sandy desert, Lower Sonoran Zone; Colorado Desert, California, and Lower California eastward through Texas and Central Mexico. Type locality: El Paso, Texas. July-Sept.

4. *Boerhaavia triquetra* S. Wats. Slender *Boerhaavia*. Fig. 1574.

Boerhaavia triquetra S. Wats. Proc. Amer. Acad. 24: 69. 1889.

Slender-stemmed annual, branching from the base with ascending branches. Leaves oblong to narrowly lanceolate, 1-3 cm. long, paler beneath, sometimes glandular punctate; inflorescence cymose, usually much branched, the branches slender; flowers pink, solitary, rarely in clusters of 2 or 3, 1.2-1.4 mm. long; stamens 2, included; fruit obpyramidal, 3-5-angled, in ours mostly 5-angled, 2-2.5 mm. long, 1.3-1.8 mm. broad, angles broad, mostly smooth, very acute, sulci open, rugose.

In sandy or rocky desert soil, Lower Sonoran Zone; Little San Bernardino Mountains, California, and western Arizona to eastern Lower California and western Sonora, Mexico. Type locality: Los Angeles Bay, Lower California. Sept.-Oct. Our specimens differ from the type in having the fruit 4-5- instead of 3-4-angled, and angles less acute.

5. *Boerhaavia Wrightii* A. Gray. Wright's Boerhaavia. Fig. 1575.

Boerhaavia Wrightii A. Gray, Amer. Journ. Sci. II. 15: 322. 1853.

Boerhaavia bracteata S. Wats. Proc. Amer. Acad. 20: 370. 1885.

Erect annual, 1-3 dm. high, branching from the base, the stems slender, pubescent below. Leaves oblong to lanceolate, acute at apex, 2-5 cm. long, blades 1.5-4 cm. long, green above, pale and glandular-punctate beneath; inflorescence glabrous or puberulent, the flowers in loose spikes; bracts 3 mm. long, persistent, ciliolate; perianth pink, 1-2 mm. long; fruit clavate to oblong, 2 mm. long, at least 1 mm. wide, mostly 4-angled, the angles broad but acute, sulci broad, rugose.

Gravelly plains and hillsides, Lower Sonoran Zone; Nevada and southeastern border of California eastward to western Texas and south to Coahuila, Mexico. Type locality: El Paso, Texas. July-Sept.

Boerhaavia Coblteri (Hook. f.) S. Wats. Proc. Amer. Acad. 24: 70. 1899. Flowers in spikes as in *B. Wrightii* but having much more narrow fruit, narrow sulci and very short deciduous bracts. Reported from the southeastern part of California.

5. *ALLIÖNIA* L. Syst. ed. 10. 890. 1759.

Prostrate annuals or perennials with dichotomous branches. Flowers perfect in axillary pedunculate clusters of 3, each subtended by a bract which encloses the fruit. Perianth 4-5-lobed. Stamens 4-7, exserted. Stigma capitate. Anthocarp coriaceous, compressed, the margins thin, entire or toothed, revolute, outer surface with 1-2 longitudinal rows of stipitate glands. Embryo curved, the broad cotyledons enclosing the endosperm. [Name in honor of Allioni, early Italian botanist.]

A genus of about 3 species found in the arid southwestern portion of the United States and south through the American tropics to South America. Type species, *Allionia incarnata* L.

1. *Allionia incarnata* L. Allionia or Windmills. Fig. 1576.

Allionia incarnata L. Syst. ed. 10. 890. 1759.

Allionia malacoides Benth. Bot. Sulph. 44. 1844.

Wedelia incarnata Kuntze, Rev. Gen. Pl. 533. 1891.

Wedeliella incarnata Cockerell, Torreya 9: 167. 1909.

Wedelia incarnata subsp. *villosa* Standley, Contr. U.S. Nat. Herb. 12: 333. 1909.

Wedelia incarnata subsp. *nudata* Standley, Contr. U.S. Nat. Herb. 12: 334. 1909.

Winter annuals or perennials, with numerous, much-branched often trailing stems, 2-10 dm. long, densely viscid-villous or glandular-puberulent throughout. Leaves 2-6 cm. long, petioles 0.4-2.5 mm long, blades broadly deltoid-orbicular to oval, usually rounded at the base, unequal, green above, paler beneath; involucre on slender peduncles, 3-5 cm. long, the lobes free, ovate-orbicular, 5-9 mm. long; perianth 6-15 mm. long, purplish red, rarely white; fruits 3-4.5 mm. long, inner side 3-nerved, margins with 3-5 broad teeth or sometimes entire, strongly incurved.

Dry, sandy soil, Upper and Lower Sonoran and Tropical Zones; southeastern California east to southern Colorado, south to Chile and Argentina. Type locality: Venezuela. April-Sept.

6. *OXÝBAPHUS* L'Her. ex Willd. Sp. Pl. 1: 185. 1797.

Perennial plants, mostly herbaceous from a woody root, the branches swollen at the nodes. Leaves opposite, entire, sessile or petiolate. Flowers perfect, 1-3 in each involucre. Involucre 5-lobed, accrescent, nearly rotate in age and strongly reticulate-veined. Perianth campanulate to short-funnelform, the limb 5-lobed. Stamens unequal, 3-5, slightly united at the base. Stigma depressed-capitate. Anthocarp narrowly obovoid, constricted at base, conspicuously 5-angled or -ribbed, mucilaginous when wet. Embryo curved; cotyledons enclosing the copious endosperm. [Name Greek, meaning a shallow dish, referring to the involucre.]

A genus of about 25 species of the American tropical and subtropical regions and one additional species in the Himalayan region. Type species, *Allionia violacea* L.

Perianth longer than broad; leaves linear.

1. *O. coccineus*.

Perianth broader than long; leaves not linear.

Fruiting involucre 7-8 mm. long; leaves obtuse.

2. *O. pumilus*.

Fruiting involucre 10-15 mm. long; leaves acuminate.

3. *O. nyctagineus*.

1. *Oxybaphus coccineus* Torr. Red Umbrella-wort. Fig. 1577.

Oxybaphus coccineus Torr. Bot. Mex. Bound. 169. 1859.

Mirabilis coccinea Benth. & Hook. Gen. Pl. 3: 3. 1880.

Oxybaphus linearifolius S. Wats. Proc. Amer. Acad. 17: 375. 1882.

Allionia linearis var. *coccinea* M. E. Jones, Contr. West. Bot. No. 10: 51. 1902.

Allionia coccinea Standley, Contr. U.S. Nat. Herb. 12: 339. 1909.

Allionia gracillima Standley, Contr. U.S. Nat. Herb. 12: 340. 1909.

Plants 3-6 dm. high, with slender erect or ascending branches, glaucescent, glabrous except on the growing parts. Leaves filiform to linear, 3-8 cm. long, 1-6 mm. wide; inflorescence loosely cymose; involucre short-pilose, the lobes deeply cut, acute, 3-4 mm. long when young, 5-6 mm. in age; perianth deep red, 12-15 mm. long, the tube funnelform; stamens exserted; fruit finely puberulent, 5-ribbed, somewhat rugose.

Desert slopes, Upper Sonoran Zone, Providence Mountains, California, east to New Mexico. Type locality: Copper Mines, New Mexico. May-Aug.



1573



1574



1575



1576



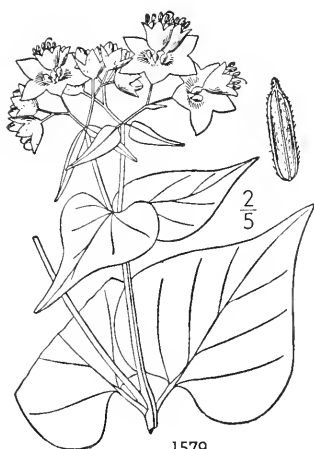
1577



1578



1580



1579



1581

1573. *Boerhaavia intermedia*
 1574. *Boerhaavia triquetra*
 1575. *Boerhaavia Wrightii*

1576. *Allionia incarnata*
 1577. *Oxybaphus coccineus*
 1578. *Oxybaphus pumilus*

1579. *Oxybaphus nyctagineus*
 1580. *Mirabilis MacFarlanei*
 1581. *Mirabilis Greenei*

2. *Oxybaphus pumilus* Standley. Little Umbrella-wort. Fig. 1578.

Allionia pumila Standley, Contr. U.S. Nat. Herb. 12: 345. 1909.

Allionia Brandegei Standley, Contr. U.S. Nat. Herb. 12: 346. 1909.

Allionia pachyphylla Standley, Contr. U.S. Nat. Herb. 12: 346. 1909.

Oxybaphus Brandegei Weatherby, Proc. Amer. Acad. 49: 492. 1913.

Oxybaphus pumilus Standley, Field Mus. Bot. Ser. 8: 11. 1930.

Plants 1–5 dm. high, procumbent or ascending, short-pilose throughout, rarely glabrate with age. Leaves deltoid to ovate-deltoid, 2–7 cm. long, truncate or slightly decurrent on the petiole; inflorescence viscid-pilose, axillary or in narrow cymes, conspicuously bracteate; involucre 3–4 mm. long in anthesis, 7–8 mm. long in age, densely pilose, the lobes obtuse; perianth 8–10 mm. long, pilose, pale pink; stamens long-exserted; fruit 5 mm. long, short-pilose, rugose.

Rocky desert slopes, Upper Sonoran Zone; San Bernardino and Providence Mountains, California, east to western New Mexico. Type locality: Kingman, Arizona. June–Aug.

3. *Oxybaphus nyctagineus* (Michx.) Sweet. Common Umbrella-wort. Fig. 1579.

Allionia nyctaginea Michx. Fl. Bor. Amer. 1: 100. 1803.

Oxybaphus nyctagineus Sweet, Hort. Brit. ed. 1. 334. 1827.

Plants 3–6 dm. high, ascending, glabrous or nearly so. Leaves petiolate, ovate-lanceolate, 3–10 cm. long; inflorescence many flowered, cymose; involucre 5–6 mm. long in anthesis, 10–15 mm. in age, the lobes obtuse, short-pilose on the margin, sometimes pilose at base; perianth reddish, 8–10 mm. long; pedicels slender; stamens exserted; fruit 5–6 mm. long, pilose, rugose.

Adventive in southern California; native, Montana to Wisconsin and south to Mexico. Type locality: banks of the Tennessee River. May–Aug.

Oxybaphus linearis (Pursh) Robinson, Rhodora 10: 31. 1908. A species characterized by linear leaves and purple flowers has been collected at Riverside, California.

7. *MIRABILIS* L. Sp. Pl. 177. 1753.

Perennial herbs or shrubs with dichotomously branching stems and opposite entire leaves. Involucres axillary or clustered at the ends of the branches, 1–10-flowered, somewhat accrescent with age. Perianth surpassing the involucre, in ours, funnellform to campanulate-funnelform with short tube. Stamens 3–5, unequal; filaments capillary. Stigma capitate. Anthocarp ellipsoid to oval, smooth or obscurely angled. [Latin, meaning wonderful.]

A genus of about 20 species, native of western North America, Central and South America. Type species, *Mirabilis Jalapa* L.

Involucre 3–10-flowered; perianth funnellform.

Perianth 1.5–2.5 cm. long; involucre nearly rotate in fruit.

Perianth 3.5–5 cm. long; involucre tubular to narrowly campanulate in fruit.

Fruit 5-angulate; herbage essentially glabrous.

Fruit smooth with 10 vertical lines; herbage usually pubescent.

Involucre 1-flowered; perianth campanulate.

Lobes of the involucre lanceolate to narrowly lanceolate, equaling or longer than the tube.

Lobes of the involucre triangular or acute, sometimes obtuse, mostly shorter than the tube.

Stems viscid-villous; leaves thick, viscid-villous; flowers white or pink.

Stems rough-pubescent, sometimes viscid-pubescent to glabrate; leaves rough-pubescent to glabrate; flowers rose-purple.

1. *M. MacFarlanei*.

2. *M. Greenei*.

3. *M. Froebelii*.

4. *M. tenuiloba*.

5. *M. Bigelovii*.

6. *M. laevis*.

1. *Mirabilis MacFarlanei* Constance & Rollins. MacFarlane's Four-o'clock or *Mirabilis*. Fig. 1580.

Mirabilis MacFarlanei Constance & Rollins, Proc. Biol. Soc. Wash. 49: 148. 1936.

Branched finely puberulent perennials, 6–10 dm. high, forming large clumps, the stems decumbent or ascending. Leaves short-petioled, orbicular to ovate-oblong, usually obtuse at the apex, sometimes subcordate at the base, 4.5–7 cm. long, about as broad as long; involucre 4–7-flowered, irregularly and usually deeply lobed, the lobes oval, obtuse or apiculate, 1.5–2.5 cm. high, nearly rotate in fruit; perianths rose-purple, 1.5–2.5 cm. long, broadly funnellform with a broad limb, stamens exceeding the perianth; anthocarp 6–8 mm. long, brownish gray, rugulose, terete but marked at the constricting base with 10 low ribs.

Known only from the type locality, Upper Sonoran Zone; Snake River Canyon, Wallowa County, Oregon. Type locality: Lower Cottonwood Landing, Wallowa County, Oregon. May.

2. *Mirabilis Greenei* S. Wats. Greene's Four-o'clock or *Mirabilis*. Fig. 1581.

Mirabilis Greenei S. Wats. Proc. Amer. Acad. 12: 253. 1876.

Quamoclidium Greenei Standley, Contr. U.S. Nat. Herb. 12: 358. 1909.

Perennials 3–6 dm. high, glabrous or obscurely puberulent around the inflorescence, stems many, stout. Leaves thick, short-petiolate, glaucescent, ovate to ovate-oblong, apiculate to acute at the apex, 4.5–10 cm. long; involucre campanulate, 2.5–4 cm. long, 5-lobed, the lobes one-third to one-half the length of the involucre, 5–8-flowered; perianth rose-purple, 3.5–5 cm. long,

tube abruptly expanding into a broad 5-lobed limb; stamens as long as the perianth; anthocarp elliptic-oblong, obscurely 5-angled, rugulose, dark brown.

Hills and stream beds, Arid Transition Zone; Oregon border south in the Inner Coast Ranges to Colusa County, California. Type locality: Yreka, California. May-June.

3. *Mirabilis Froebelii* (Behr) Greene. Froebel's Four-o'clock or *Mirabilis*. Fig. 1582.

Oxybaphus Froebelii Behr, Proc. Calif. Acad. 1: 69. 1855.

Mirabilis multiflora var. *pubescens* S. Wats. Bot. Calif. 2: 2. 1880.

Mirabilis Froebelii Greene, Bull. Calif. Acad. III. 1: 124. 1885.

Quamoclidion Froebelii Standley, Contr. U.S. Nat. Herb. 12: 359. 1909.

Quamoclidion multiflorum subsp. *obtusum* Standley, Contr. U.S. Nat. Herb. loc. cit.

Much-branched perennials 3-8 dm. high, forming large clumps, densely viscid-pubescent throughout. Leaves thick, 6-11 cm. long with stout petioles, broadly ovate, sometimes orbicular, mucronate or acute at the apex; involucre 5-9-flowered, somewhat accrescent with age, 2-3 cm. long, the lobes about one-third the length of the involucre; perianth rose-purple, 3.5-4.5 cm. long, expanded into a shallowly 5-lobed limb, usually viscid-pubescent without; anthocarp 8 mm. long, slightly constricted at both ends, brown with darker spots and marked with 10 pale or dark vertical lines.

Dry sandy soil, Upper Sonoran Zone; southern Nevada and Arizona to Kern County, California, and south to Lower California, Mexico. Type locality: Warner's Ranch, San Diego County, California. April-Aug.

Mirabilis Froebelii var. *glabrata* (Standley) Jepson, Fl. Calif. 458. 1914. Differs from the species in being nearly glabrous and except for the vertical markings on the fruits strongly suggests *Mirabilis multiflora* Torr. With the species in its southern and eastern distribution.

4. *Mirabilis tenuiloba* S. Wats. Long-lobed Four-o'clock. Fig. 1583.

Mirabilis tenuiloba S. Wats. Proc. Amer. Acad. 17: 375. 1882.

Hesperonia tenuiloba Standley, Contr. U.S. Nat. Herb. 12: 363. 1909.

Erect perennial, suffrutescent at the base, 4-6 dm. high with rather stout white branches and swollen nodes. Leaves deltoid to ovate-deltoid, acute at the apex, short-petioled, 2-3.5 cm. long, glandular-pubescent; flowers many, clustered on the ends of the leafy branches, the inflorescence densely glandular-pubescent, sometimes villous; involucre 1-flowered, 9-15 mm. long, the lanceolate lobes equaling or longer than the tube, somewhat accrescent with age; perianth 10-15 mm. long, white; fruit oval, smooth, brown.

Sandy desert, Lower Sonoran Zone; San Bernardino County, California, south to Lower California, Mexico. Type locality: near Palm Springs, Riverside County, California. April-June.

5. *Mirabilis Bigelovii* A. Gray. Desert Four-o'clock or Wishbone Bush. Fig. 1584.

Mirabilis Bigelovii A. Gray, Proc. Amer. Acad. 21: 413. 1886.

Hesperonia Bigelovii Standley, N. Amer. Fl. 21: 235. 1918.

Hesperonia glutinosa subsp. *gracilis* Standley, U.S. Nat. Herb. 12: 365. 1909.

Dichotomously much branched, suffrutescent, erect or spreading perennial, stems many, typically stout, glandular-villous even in age. Leaves 1.5-3 cm. long, suborbicular to deltoid-ovate, subcordate to rounded at the base, densely viscid-villous; flowers in clusters at the ends of the branches; involucre 5-6 mm. long, densely viscid-villous, lobes shorter than the tube, acute or rounded; perianth 7-11 mm. long, white or pink; fruit dark, ovoid, often mottled and sometimes microscopically rugulose.

Desert canyons, Lower Sonoran Zone; southwestern Nevada and adjacent California south through eastern Mojave and Colorado Deserts to Arizona and Sonora. Type locality: near Peach Springs, Arizona. April-June.

Mirabilis Bigelovii var. *aspera* (Greene) Munz, Man. S. Calif. 151. 1935. Characterized by both scabrous and glandular-villous pubescence on the stems and usually rose-purple flowers. Western Mojave and Colorado Deserts, California.

Mirabilis Bigelovii var. *retrorsa* (Heller) Munz, Man. S. Calif. 151. 1935. With scabrous and retrorse-scabrous or glabrous stems and with white or pink flowers. Western Nevada and Mono County to the Colorado Desert, California.

6. *Mirabilis laevis* (Benth.) Curran. Coastal Four-o'clock. Fig. 1585.

Oxybaphus laevis Benth. Bot. Sulph. 44. 1844.

Mirabilis californica A. Gray in Torr. Bot. Mex. Bound. 173. 1859.

Mirabilis laevis Curran, Proc. Calif. Acad. II. 1: 235. 1888.

Hesperonia californica subsp. *microphylla* Standley, Contr. U.S. Nat. Herb. 12: 365. 1909.

Hesperonia cedrosensis Standley, Contr. U.S. Nat. Herb. 12: 262. 1909.

Dichotomously much-branched perennial, decumbent, woody at the base, the stems many, typically slender, glabrous or scabrous. Leaves ovate to ovate-deltoid, cordate or subcordate, 1-4 cm. long, basal leaves often long, petioled, upper short-petioled or sessile, sparsely glandular-pubescent with coarse or scabrous hairs to glabrate; flowers in clusters at ends of the branches, inflorescence glandular, more or less densely pubescent, involucre campanulate, lobes acute, shorter than the tube, short viscid-villous, sometimes tinged with purple, 5-8 mm. long, scarcely accrescent with age; perianth funnel-form-campanulate, rose-purple, surpassing the involucre; fruit oval to elliptic-oval, dark, sometimes mottled, sometimes marked with paler vertical lines.

Dry hillsides, Upper Sonoran Zone; in the Coast Ranges and adjacent islands, Santa Lucia Mountains, Monterey County, California, south to Lower California. Type locality: Magdalena Bay, Lower California, Mexico. Jan.-Dec. A variable species as to pubescence and habit.

8. *ABRÔNIA* Juss. (Gen. 448, hyponym. 1789) ex Lam. Tab.

Encyc. 1: 469. 1791.

Annual or perennial branching herbs, erect or prostrate, sometimes appearing acaulescent, usually viscid-pubescent. Leaves opposite, unequal, thick, the margins entire or sinuate. Flowers perfect, in pedunculate heads, subtended by 5–8 scarious bracts. Perianth fragrant, salverform with a slender tube constricted above the ovary, enlarged at the throat, the limb with 4–5 emarginate lobes. Stamens 4–5, unequal, united at the base and adnate to the perianth-tube above, included. Stigma fusiform. Anthocarp turbinate or bi-turbinate, deeply lobed or winged, not mucilaginous when wet; seed elliptic-oblong, dark brown, one cotyledon enclosing the farinaceous endosperm, the other abortive. [Greek, meaning graceful.]

A genus of about 25 species distributed over western and central United States and Canada and adjacent Mexico. Type species, *Abronia umbellata* Lam.

Fruit winged (central cavity not extending into the edges of the wings).

Wings of the fruit translucent, completely enclosing the body of the fruit.

1. *A. Crux-Maltae*.

Wings of the fruit opaque, interrupted above and below the body of the fruit.

Flowers white; plants perennial, erect or decumbent.

2. *A. mellifera*.

Flowers rose-purple (rarely white); plants annual or if perennial, then prostrate.

Stems and inflorescence long-villous; body of fruit and base of wings coarsely rugose-veined; plants of the interior.

3. *A. villosa*.

Stems and inflorescence puberulent to short-villous; body of fruit not rugose-veined; plants of the seashore.

4. *A. umbellata*.

Fruit wingless or merely lobed (with the central cavity extending to the edges of the wing-like lobes.)

Fruit lobed.

Flowers bright crimson or yellow; plants of seashore.

Flowers yellow; leaves orbicular or reniform, as wide or wider than long.

5. *A. latifolia*.

Flowers bright crimson; leaves oval, longer than broad.

6. *A. maritima*.

Flowers white to rose-colored; plants of mountains and deserts of the interior.

Plant perennial, with a thick caudex, appearing caespitose.

7. *A. nana Covillei*.

Plant annual.

Fruit obcordate, with 2 regular wing-like lobes.

9. *A. pogonantha*.

Fruit obpyramidal with shallow, irregular lobes.

10. *A. turbinata*.

Fruit wingless.

Flowers 1–5 in each head; plant forming dense mats.

8. *A. alpina*.

Flowers 15–30 in each head; plants erect or decumbent.

10. *A. turbinata*.

1. *Abronia Crux-Maltae* Kellogg. Kellogg's Sand-verbena. Fig. 1586.

Abronia Crux-Maltae Kellogg, Proc. Calif. Acad. 2: 71. 1863.

Tripteroocalyx Crux-Maltae Standley, Contr. U.S. Nat. Herb. 12: 328. 1909.

Branched annual, erect or decumbent herbs with viscid-villous to glabrate stems. Leaves bright green, broadly ovate to elliptic-oblong, 3–7 cm. long, viscid-villous, the blades often glabrate; inflorescence 1–6 cm. long; involucre bracts 4–7, 6–10 mm. long, ovate-lanceolate; perianth rose-colored with greenish throat, tube pale, 1.8–2.5 cm. long, mostly 4-merous, the divisions deeply bilobate; anthocarp round or slightly flattened in outline, 1–1.5 cm. long, the wings 2, rarely 3, thin, translucent, coarsely reticulate-veined, body of the fruit indurate, glandular-villous, with coarsely transverse veins continuous with those of the wings.

Sandy soil, Arid Transition Zone; central and northwestern Nevada and adjacent California. Type locality: Carson Valley, Washoe County, Nevada. May–June.

Abronia micrantha Torr. in Frem. Rep. 92. 1843. An allied species with greenish-white flowers and nearly glabrous fruit has been reported from sand dunes near Kelso, San Bernardino County, California (Jaeger).

2. *Abronia mellifera* Dougl. Honey-scented Sand-verbena or *Abronia*. Fig. 1587.

Abronia mellifera Dougl. ex Hook. Bot. Mag. 56: pl. 2879. 1829.

Abronia Suksdorfii Coult. & Fisher, Bot. Gaz. 17: 348. 1892.

Abronia lanceolata Rydb. Bull. Torrey Club 29: 685. 1902.

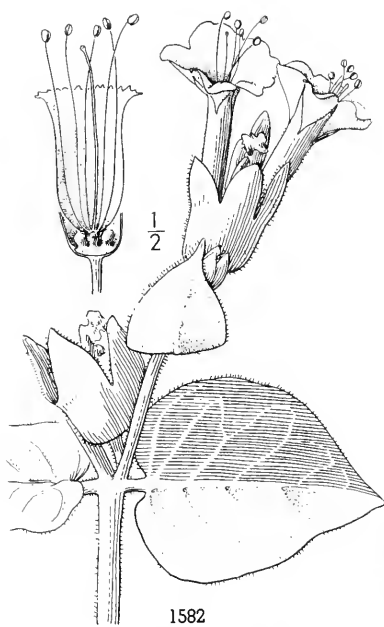
Perennial herb, 2–6 dm. high with erect or decumbent, pale, puberulent or glabrate stems. Leaves 5–10 cm. long, glabrate, sometimes minutely puberulent, petioles equaling or exceeding the ovate-oblong to lance-elliptic blades, margins entire or occasionally subsinuate; peduncles 5–15 cm. long, glandular-puberulent; bracts white, lanceolate to ovate-lanceolate, 10–15 mm. long; flowers many; perianth 18–25 mm. long, tube very slender, minutely glandular-puberulent, greenish white, limb 8–11 mm. broad, white; fruit 7–10 mm. long, turbinate, wings thin, usually 5, regular, narrowed below, truncate above or extending above the indurate body of the fruit in short rounded lobes, reticulate, puberulent, outer fruits often wingless.

Sandy soil, Arid Transition Zone; Idaho to eastern Oregon and Washington. Type locality: "near the great falls of the Colombia"; collected by Douglas. May–Aug.

3. *Abronia villosa* S. Wats. Desert Sand-verbena or *Abronia*. Fig. 1588.

Abronia villosa S. Wats. Amer. Nat. 7: 302. 1893.

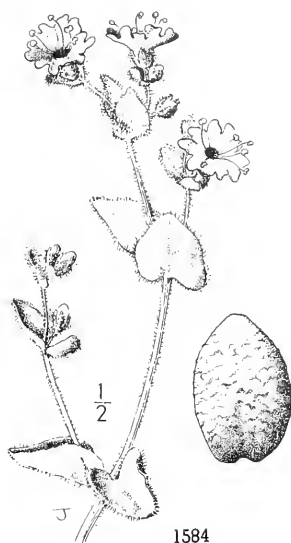
Ascending, decumbent or procumbent annuals with stout, densely viscid-villous branches 1–4 dm. long. Leaves 2–4 cm. long, petioles densely viscid-villous, blades 1.5–3 cm. long, often irregular at the base, obscurely undulate-margined, sparingly glandular, short-villous on the



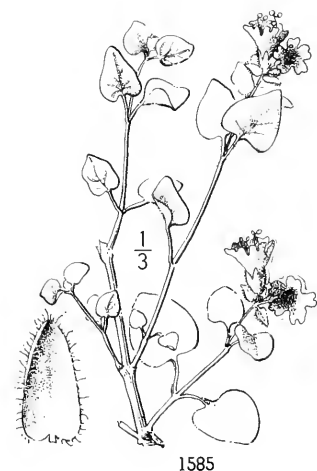
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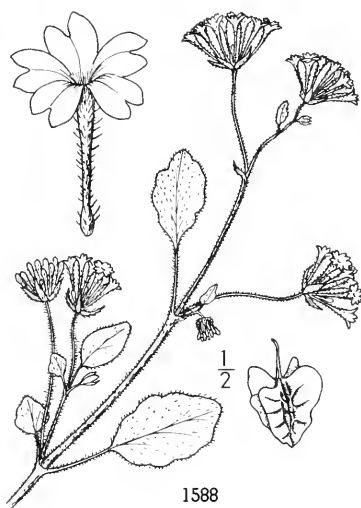
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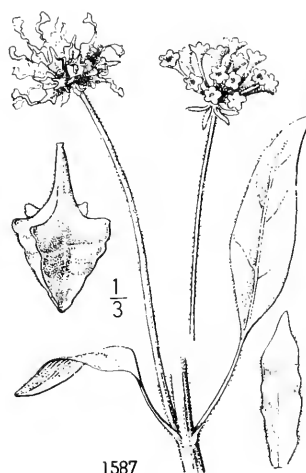
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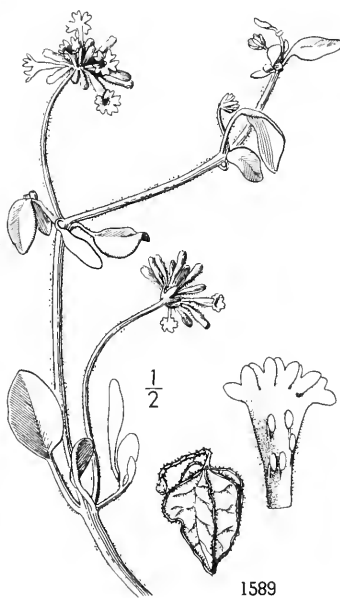
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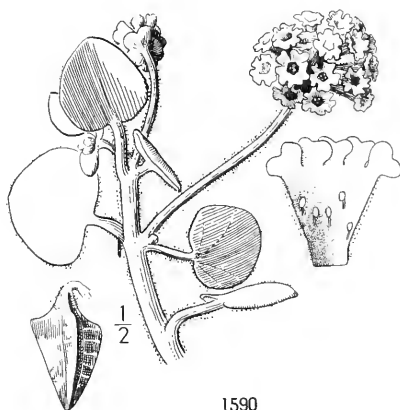
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1590

1582. *Mirabilis Froebelii*
 1583. *Mirabilis tenuiloba*
 1584. *Mirabilis Bigelovii*

1585. *Mirabilis laevis*
 1586. *Abronia Crux-Maltae*
 1587. *Abronia mellifera*

1588. *Abronia villosa*
 1589. *Abronia umbellata*
 1590. *Abronia latifolia*

margin; peduncles slender, 2–7 cm. long, usually densely viscid-villous; involucre bracts lanceolate to linear-lanceolate, 7–9 mm. long; perianth 9–14 mm. long, densely viscid-villous, rose-colored; fruit 4–8 mm. long, wings usually 3, truncate or acutely prolonged above the body of the fruit, narrowed below, body of the fruit indurate, beaked above, coarsely rugose-reticulate, the reticulation extending into the irregular wings.

In sandy soil, Lower Sonoran Zone; southern Nevada and southeastern California south to western Sonora and Lower California. Type locality: Arizona. March–Oct.

Abronia pinetorum Abrams and *Abronia aurita* Abrams, Bull. Torrey Club 32: 537. 1905. Stout, much branched forms, occasionally almost glabrate, characterized by large perianths 2.5–3 cm. long and by fruits larger than those of *Abronia villosa*. Western and central Riverside County, Orange County, and central San Diego County, California.

4. *Abronia umbellata* Lam. Beach Sand-verbena or *Abronia*. Fig. 1589.

Abronia umbellata Lam. Tab. Encyc. 1: 469. 1791.

Tricratus admirabilis L'Her. ex Willd. Sp. Pl. 1: 807. 1797.

Abronia californica Raesch. Nom. Bot. ed. 3. 191. 1797.

Abronia rotundiflora Gaertner, Fruct. 3: 181. 1807.

Abronia alba Eastw. Proc. Calif. Acad. III. 1: 97. 1898.

Perennial prostrate herbs, branches mostly slender, 2–10 dm. long, nodes long or short depending on growing conditions, minutely viscid-puberulent to viscid-pubescent. Leaves oval or rhombic-oval to lance-elliptic or lance-oblong, 2.5–7 cm. long, entire or sinuate in outline, petioles typically as long or longer than the blades; peduncles 2–12 cm. long, equaling or shorter than the nodes except in vigorous specimens, viscid-puberulent, bracts lanceolate, 4–6 mm. long; perianth rose, rarely white, tube 10–15 mm. long, glandular-pubescent, limb 8–10 mm. broad with deeply emarginate lobes; fruit 7–12 mm. long, about as wide as long, glandular-villous above, becoming glabrate, body of the fruit indurate with a short beak, wings 2–5, usually 4, sometimes none, irregularly and faintly reticulate-veined, narrowed below, widened above, truncate or with rounded lobes, or tapering to the beak.

Sea beaches, Upper Sonoran, Humid Transition and Canadian Zones; British Columbia south to Lower California. Type locality: Monterey, California. Jan.–Dec.

The form characterized by having the wings of the fruit narrowed above as well as below is much more commonly found in the northern part of the range of the species. In the southern extension, from the type locality southward, the form having the wings of the fruit produced upward in rounded lobes is more prevalent. At Monterey both types are common.

Abronia acutalata, *A. breviflora*, *A. minor*, *A. neurophylla*, *A. insularis*, *A. variabilis* Standley (Contr. U.S. Nat. Herb. 12: 311–314. 1909), are all minor variations.

5. *Abronia latifolia* Eschsch. Yellow Sand-verbena or *Abronia*. Fig. 1590.

Abronia latifolia Eschsch. Mém. Acad. St.-Petersb. 5: 271. 1826.

Abronia arenaria Menzies ex Hook. Exot. Fl. 3: pl. 193. 1827.

Tricanthus arenarius Spreng. Syst. Cur. Post. 53. 1827.

Prostrate glandular perennial, with thick fleshy roots and stout stems, 2–10 dm. long. Leaves thick, orbicular to reniform, rarely rounded-deltoid, 3–6 cm. long; petioles 1.5–4 cm. long, densely viscid-puberulent; blades 1–3 cm. long, glabrate; peduncles 2–4 cm. long; bracts 5–6, ovate to ovate-lanceolate, 6–8 mm. long; perianth 13–18 mm. long, the tube slender, glandular-villous, greenish yellow, the limb 5–8 mm. broad, bright yellow, lobes shallowly emarginate; fruit 8–15 mm. long, coriaceous, puberulent, mostly biturbinate with 5 wing-like reticulate-veined lobes, these attenuate upward on the body of the fruit.

On sea beaches, Canadian, Humid Transition and Upper Sonoran Zones; British Columbia to Santa Barbara County, California. Type locality: California. Feb.–Nov.

6. *Abronia maritima* Nutt. Red Sand-verbena or *Abronia*. Fig. 1591.

Abronia maritima Nutt. ex S. Wats. Bot. Calif. 2: 4. 1880.

Prostrate perennials, glandular-puberulent to villous throughout with fleshy roots and very stout trailing stems, 2–10 dm. long. Leaves thick, 4–6 cm. long, petioles 1–2 cm., blades thick, 3–6 cm. long, oval or oval-oblong, cuneate or rounded at base, rounded at apex; peduncles 3–8 cm. long, bracts lanceolate to ovate-lanceolate, 6–8 mm. long, perianth 11–14 mm. long, dark crimson, limb 3–5 mm. broad; fruit coriaceous, densely puberulent above and glabrate below, 10–14 mm. long, turbinate, wing-like lobes irregular, usually 5, truncate above, scarcely extending above the body of the fruit, attenuate below, body and base of the fruit coarsely reticulate-veined.

On sea beaches, Upper and Lower Sonoran Zones; San Luis Obispo County south to Lower California and Sinaloa, Mexico. Type locality: San Pedro, California. Feb.–Nov.

7. *Abronia nana* var. *Covillei* (Heimerl) Munz. Coville's Dwarf *Abronia*. Fig. 1592.

Abronia Covillei Heimerl, Smiths. Misc. Coll. 52: 197. 1908.

Abronia nana var. *Covillei* Munz, Man. S. Calif. 150, 598. 1935.

Densely caespitose, glandular perennials with woody roots and short, stout branching caudex, puberulent throughout with short, scattered hairs. Leaves clustered, 2–4 cm. long, petioles slender, 1–3 cm. long, blades ovate to oblong, 5–15 mm. long; peduncles scape-like, 4–10 cm. long; bracts 4–6, 4–6 mm. long, lanceolate to narrowly ovate; perianth 10–13 mm. long, white with a pink tube; fruit 6–8 mm. long, obcordate with 5 thin-walled, regular, wing-like lobes.

Arid Transition Zone; Inyo Mountains, Inyo County, California, and adjacent ranges in Nevada south to the San Bernardino Mountains, California. Type locality: Inyo Mountains, California. June–Aug.

8. *Abronia alpina* Brandg. Alpine *Abronia* or Sand-verbena. Fig. 1593.*Abronia alpina* Brandg. Bot. Gaz. 27: 456. 1899.

Plant perennial, the prostrate branches forming mats 1–2 dm. in diameter, viscid-puberulent throughout. Leaves 2–3.5 cm. long, blades rounded-oval, entire; peduncles of the inflorescence shorter than the petioles; bracts lanceolate-ovate, 2–3 mm. long; heads 1–5-flowered; perianth lavender-pink, 10–15 mm. long, limb broad; fruit 3–4 mm. long, narrowed at both ends, obtusely or acutely 5-angled, reticulate-veined.

In sandy meadows, Canadian Zone; in the southern Sierra Nevada, California. Type locality: Monache Meadows, Sierra Nevada, California. June–July.

9. *Abronia pogonantha* Heimerl. Mojave Sand-verbena or *Abronia*. Fig. 1594.*Abronia pogonantha* Heimerl, Bot. Jahrb. 11: 87. 1889.*Abronia angulata* M. E. Jones, Contr. West. Bot. No. 8: 39. 1898.

Annual branching from the base, branches ascending or decumbent, 1–3 dm. long, viscid-puberulent and clothed with villous hairs. Leaves 1.5–5.5 cm. long, blades 1–3 cm. long, ovate-oblong to oblong, rounded at and equal at the base, villous on the midvein; petioles densely villous and glandular; involucre bracts scarious, broadly ovate, acute at the apex, 6–9 mm. long; perianth glandular, 10–15 mm. long, white or pale pink; fruit 3–5 mm. long, thin in texture, finely reticulate-veined, orbicular-obcordate with 2, rarely 3, regular wing-like lobes, fruits in the center of the head, occasionally wingless.

In sandy soil, Lower Sonoran Zone; central Inyo County, California, and the western borders of Nevada south to the lower San Joaquin Valley and east through the Mojave Desert, California. Type locality: Mojave River, California. April–June.

10. *Abronia turbinata* Torr. Transmontane *Abronia*. Fig. 1595.*Abronia turbinata* Torr. ex S. Wats. Bot. King Expl. 285. 1871.*Abronia latiuscula* Greene, Leaflets Bot. Obs. 2: 105. 1910.

Much-branched annual with erect, ascending or decumbent branches 2–5 dm. long, viscid-puberulent to glabrate. Leaves yellowish-green, rarely viscid, ovate-orbicular, irregular at the base, 2–5 cm. long, blade 12–25 mm. long; involucre bracts 4–9 mm. long, narrowly ovate-acute to lanceolate; perianth viscid-puberulent, 15–22 mm. long, tube pinkish, limb white; fruits often beaked, short-villous, 3–7 mm. long, the inner usually simple turbinate, often beaked, the outer deeply divided into wrinkled wing-like lobes or shallowly with broad obtuse lobes.

In sandy soil, Arid Transition Zone; southeastern Oregon south along the eastern slopes of the Sierra Nevada and central Nevada to the Mount Pinos region, California. May–June.

Abronia exaltata Standley, Contr. U.S. Nat. Herb. 12: 318. 1909. A form characterized by wingless or 2-winged fruit in which the wings are sharply incurved. The smaller fruits and flowers are by no means confined to this form. The distribution is the same as that of *A. turbinata*.

Family 39. ILLECEBRACEAE.**KNOTWORT FAMILY.**

Small diffusely branched herbs, with mostly opposite entire leaves and scarious stipules or stipules none in *Scleranthus*. Flowers small, greenish or whitish, cymose. Calyx herbaceous or coriaceous, persistent, 4–5-parted into distinct sepals or 4–5-toothed. Petals none. Stamens usually 4 or 5, varying from 1 to 10, hypogynous or perigynous. Pistil one; ovary superior, 1-celled; styles 2, more or less united; ovule one, amphitropous; basal or pendulous. Fruit an achene or utricle, enclosed in the calyx-tube. Seed solitary; endosperm present, surrounded by the curved embryo.

Nineteen genera and about 100 species of wide distribution in both the eastern and western hemispheres.

Stipules present, scarious; ovule erect.

Sepals united below into a short cylindric tube.

Styles 2-cleft.

Styles 3-cleft.

Sepals distinct or nearly so.

Sepals similar.

Stipules conspicuous, silvery-scarious; sepals distinct almost to the base, bristle-tipped.

Stipules minute; sepals united below into a short turbinate tube.

Sepals dissimilar, the outer larger and tipped with stout divergent spines.

Stipules none; calyx-tube indurate in fruit; ovule pendulous

1. *Achyronychia*.2. *Scopulophila*.3. *Paronychia*.4. *Herniaria*.5. *Cardionema*.6. *Scleranthus*.**1. *ACHYRONYCHIA* Torr. & Gray, Proc. Amer. Acad. 7: 330. 1867.**

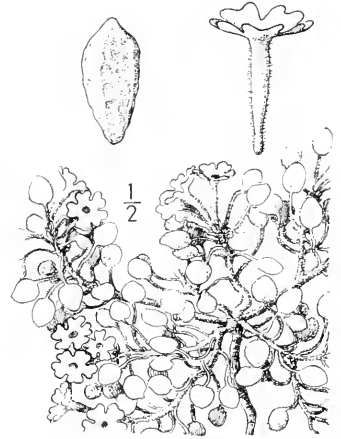
Low spreading glabrous annuals. Leaves opposite, those in each pair unequal in size, spatulate. Stipules scarious, distinct. Flowers small, borne in numerous dense axillary



1591



1592



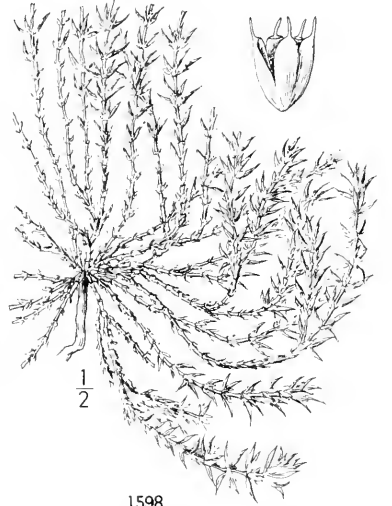
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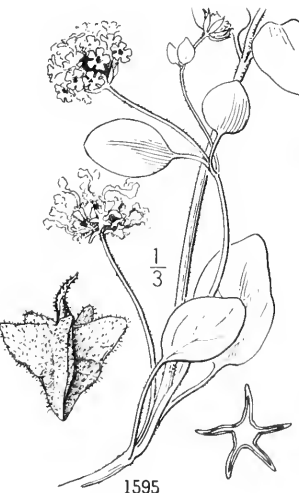
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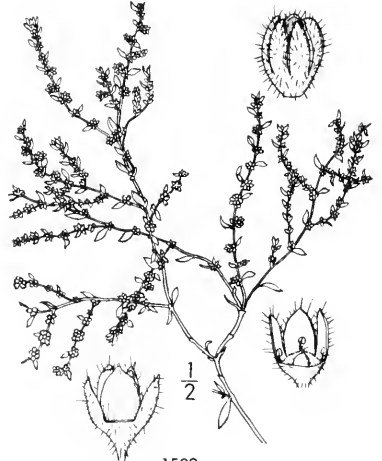
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1591. *Abronia maritima*
1592. *Abronia nana*
1593. *Abronia alpina*

1594. *Abronia pogonantha*
1595. *Abronia turbinata*
1596. *Achyronychia Cooperi*

1597. *Scopulophila Rixfordii*
1598. *Paronychia franciscana*
1599. *Herniaria cinerea*

cymose clusters. Calyx 5-lobed, the tube tubular, nearly equaling the silvery-scarious lobes. Petals none. Stamens 10–15, only 1–5 with anthers. Style 2-cleft; ovary 1-celled, 1-seeded. Utricle thin, included in the calyx-tube. [Name Greek, meaning chaff and fingernail, in reference to the silvery hyaline calyx-lobes.]

Two species, natives of the desert regions of southwestern United States and central Mexico. Type species, *Achyronychia Cooperi* Torr. & Gray.

1. *Achyronychia Cooperi* Torr. & Gray. Onyx Flower. Fig. 1596.

Achyronychia Cooperi Torr. & Gray, Proc. Amer. Acad. 7: 331. 1867.

Stems branching from the crown of the slender annual root, prostrate, the branches many, usually simple, floriferous throughout. Leaves spatulate, the larger one of the pair 10–15 mm. long, the smaller about half as long; cymes numerous, borne in the axils of all leaves, subsessile or on peduncles 15–20 mm. long; calyx-tube tubular, about 1 mm. long; calyx-lobes oval, nearly 2 mm. long, green at base, the rest conspicuously white-hyaline.

Sandy desert washes, Lower Sonoran Zone; Mojave and Colorado Deserts, California, south to central Lower California. Type locality: "In dry sand, Mojave River at Camp Cady." March–June.

Corrigiola littoralis L. Sp. Pl. 271. 1753. Small prostrate glabrous, slightly fleshy annual. Leaves alternate, small, spatulate-oblancoolate; stipules scarious; flowers minute, in axillary and terminal cymose glomerules; calyx 5-parted; petals none; stamens 5; style 3-parted; utricle included. Well established at Portland, Oregon, having come in no doubt with ballast. Native of Europe.

2. *SCOPULOPHILA* M. E. Jones, Contr. West. Bot. No. 12: 5. 1908.

Perennial, the stems erect, arising from a woody root crown. Leaves linear, gradually narrowed toward the base. Stipules hyaline, lacerate or fringed, crowded on the root crown. Flowers in small axillary few-flowered cymes. Calyx deeply 5-lobed, the lobes scarious. Stamens 5; staminodia 5, alternating with the stamens, petaloid, subtended by a minute reddish scale. Style 3-cleft; ovary 1-seeded. Fruit unknown. [Name Greek, meaning fond of rocks, in reference to its habitat.]

A monotypic genus of the Mojave Desert region.

1. *Scopulophila Rixfordii* (Brandg.) Munz & Jtn. *Scopulophila*. Fig. 1597.

Achyronychia Rixfordii Brandg. Zoe 1: 230. 1890.

Scopulophila nitrophiloides M. E. Jones, Contr. West. Bot. No. 12: 5. 1908.

Eremolithia Rixfordii Jepson, Fl. Calif. 499. 1914.

Scopulophila Rixfordii Munz & Jtn. Bull. Torrey Club 49: 351. 1923.

Stems several from a woody crown, erect, simple or with a few short ascending branches, 5–20 cm. high, whole plant glabrous and pallid. Leaves narrowly oblanceolate-spatulate, 5–15 mm. long, slightly fleshy; stipules scarious, more or less lacerate or fringed, those on the crown crowded and conspicuous; cymes few-flowered; calyx-tube scarcely 0.5 mm. long, narrowed to the base; calyx-lobes 1.5 mm. long, oval, scarious except for the narrow midrib; staminodia petaloid, narrowly linear, equaling the calyx-lobes; fertile stamens scarcely half as long; ovary conical, about as long as the 3-cleft style and the two about equaling the calyx-lobes; ovule usually solitary; fruit unknown.

A little-known species of Owens Valley, California, and adjacent southern Nevada. Type locality: Owens Valley, Inyo County, California. April–May.

3. *PARONYCHIA* [Tourn.] Adans. Fam. Pl. 2: 272. 1763.

Low tufted annual or perennial herbs, often with a woody base. Leaves opposite, usually linear; stipules scarious. Flowers small, clustered, scarious-bracted. Calyx 5-parted, the lobes awn-tipped. Corolla wanting. Stamens 5, inserted at base of calyx, sometimes alternate with as many staminodia. Ovary ovoid, narrowed upward into the style. Styles 2, united nearly to stigmas; ovule solitary. Utricle membranous, included in calyx, 1-seeded. [Name Greek, meaning whitlow or felon, the name applied to a plant used as a remedy.]

About 40 species, inhabiting temperate and tropical regions. Type species, *Illecebrum Paronychia* L.

1. *Paronychia franciscana* Eastw. California Whitlow-wort. Fig. 1598.

Paronychia franciscana Eastw. Bull. Torrey Club 28: 288. 1902.

Perennial from a woody taproot, the branches wiry, prostrate, forming mats 1–4 dm. across. Leaves linear-oblong, 5–10 mm. long, usually longer than the short internodes, narrowed to a prominent bristle at apex and to a short petiole at base, short-pubescent and ciliate; stipules lanceolate, acuminate, laciniate, about equaling the leaves; flowers few in the axils, short-pedicellate; calyx green or tinged with purple, 5-parted almost to base, 2 mm. long.

Grassy hillsides along the coast, Upper Sonoran Zone; central California. Type locality: San Francisco, California. April–June. In the earlier California manuals these plants were referred to the South American species *P. chilensis* DC.

4. *HERNIARIA* L. Sp. Pl. 218. 1753.

Annual or perennial herbs, the stems much branched, prostrate or spreading. Leaves opposite or sometimes alternate or fascicled, small, entire; stipules scarious, small, entire

or ciliate. Flowers in small axillary clusters, minute. Calyx 4-5-parted into equal or unequal segments. Corolla none. Stamens 3-5, attached to the short calyx-tube; staminodia 4-6. Ovary ovoid; style short, 2-lobed. Utricle membranaceous, included in calyx. Seed erect; embryo annular. [Name Latin, from *hernia*, meaning rupture, which one of the species was thought to cure.]

About 20 species, natives of Europe, western Asia, and Africa. Type species, *Herniaria glabra* L.

1. *Herniaria cinerea* DC. Gray *Herniaria*. Fig. 1599.

Herniaria cinerea DC. Fl. Franc. Suppl. 375. 1815.

Low spreading mat-like annual, or in diminutive plants nearly simple and ascending, hispidulous throughout. Leaves oblong-ob lanceolate, 3-10 mm. long; flowers in all the axils; calyx 1 mm. long, the short tube turbinate.

Sparingly introduced in California in the foothills surrounding the Sacramento-San Joaquin Valley and in southern California. Native of southern Europe. March-June.

5. *CARDIONEMA* DC. Prod. 3: 372. 1828.

Low tufted perennial herbs with subulate pungent leaves and hyaline stipules. Flowers in small axillary clusters, sessile. Sepals 5, nearly distinct, hooded, unequal, the 3 outer larger and tipped with a stout divergent spine. Petals 5, minute and scale-like. Stamens 3-5. Style short, 2-cleft. Utricle enclosed in the persistent spiny calyx. [Name Greek, meaning heart and thread, referring to the obcordate stamens.]

About 8 species, natives of western North and South America. Type species, *Cardionema multicaulis* DC.

1. *Cardionema ramosissima* (Weinm.) A. Nels. & Macbr. Sand Mat. Fig. 1600.

Loeflingia ramosissima Weinm. Flora 3: 608. 1820.

Pentacaena ramosissima Hook. & Arn. Bot. Misc. 3: 338. 1833.

Cardionema ramosissima A. Nels. & Macbr. Bot. Gaz. 56: 473. 1913.

Stems numerous, forming mats 10-15 cm. across, arising from the crown or from branches of the crown of an elongated woody root, densely clothed with conspicuous stipules and leaves, pubescent. Leaves subulate, 5-10 mm. long, pungent, glabrous, 3-ribbed with 2 narrow grooves between; stipules silvery, lanceolate-acuminate, often nearly as long as the leaves; sepals 3-4 mm. long, pubescent below the prominent divergent spines; utricle included in calyx, apiculate.

Dunes and beaches along the coast, Canadian to Sonoran Zones; Washington to Lower California, Mexico, and Chile. Type locality: Chile. April-Aug.

6. *SCLERANTHUS* L. Sp. Pl. 406. 1753.

Low annual or perennial herbs, glabrous or pubescent, with rigid dichotomously branched stems. Leaves opposite, connate at base, subulate, pungent. Stipules none. Flowers small, green, in small axillary or terminal cymose clusters, sessile or pedicelled, without bracts. Calyx 4-5-toothed or -lobed. Petals none. Stamens 1-10, inserted on the calyx; staminodia none. Styles 2, distinct. Ovary ovoid; ovule 1, pendulous, amphitropous. Utricle included in the indurated calyx-tube; seed lenticular. [Name Greek, meaning hard and flower, in reference to the indurated calyx.]

About 10 species of wide geographical distribution in the Old World. Type species, *Scleranthus annuus* L.

1. *Scleranthus annuus* L. Knawel, German Knotgrass. Fig. 1601.

Scleranthus annuus L. Sp. Pl. 406. 1753.

Low annual, the branches prostrate or spreading, 5-15 cm. long, roughish-puberulent or glabrous. Leaves subulate, 5-20 mm. long, scarcely pungent, short-ciliolate; calyx-tube 10-angled, the lobes about equaling the tube, their margins incurved; filaments subulate, short.

Roadsides; sparingly naturalized in the Pacific States. Native of Europe. April-June.

Family 40. *BATIDACEAE*.

BATIS FAMILY.

Low maritime woody plants, with opposite fleshy entire exstipulate leaves. Flowers dioecious, bracteate, in axillary, sessile, ament-like spikes. Bracts of the staminate flowers persistent, those of the pistillate deciduous. Calyx cup-shaped and 2-lobed in the staminate flowers, wanting in the pistillate. Corolla none. Stamens 4 or 5, alternating with staminodia; anthers introrse. Ovaries 4-12 on a spike, sessile, 4-celled; stigma sessile, cushion-like. Ovule 1 in each cell, erect, anatropous. Fruit an aggregate formed by the coalescence of the pistils. Seeds spatulate, with membranous testa; endosperm none; embryo straight, with large cotyledons.

A monotypic family of tropical and subtropical regions of the New World.

1. *BÀTIS* [P. Br.] L. Syst. Nat. ed. 10. 1380. 1759.

Characters of the family.

A single species, inhabiting the tropical and subtropical regions of the western hemisphere, and the Hawaiian Islands.

1. *Batis marítima* L. Salt-wort. Fig. 1602.

Batis marítima L. Syst. Nat. ed. 10. 1380. 1759.

Batis californica Torr. Smiths. Contr. 6: 8. 1854.

A pale glabrous strong-scented woody plant, with spreading or prostrate stems, the branchlets often erect. Leaves fleshy, semi-terete, 10–25 mm. long, acutish; staminate spikes sessile, ovoid-cylindric, 5–10 mm. long; bracts rounded, broader than long; calyx shorter than the bracts; stamens exserted, exceeding the triangular staminodia; pistillate spikes short-peduncled; pistils coalescing forming a fleshy aggregate fruit.

Salt marshes along the coast, Sonoran Zones; warm temperate and tropical regions of the New World; on the Pacific shores from San Pedro, California, to Galapagos Islands, also in the Hawaiian Islands; and on the Atlantic from North Carolina to Florida, Texas, West Indies, and Brazil. Type locality: Jamaica. July–Oct.

Family 41. *AIZOÀCEAE*.

CARPET-WEED FAMILY.

Annual or often succulent perennial herbs or some exotic species somewhat woody, the stems usually prostrate. Leaves opposite, verticillate or rarely alternate, base of the petioles sometimes dilated. Stipules none or when present scarious. Flowers solitary or clustered in the axils, regular and perfect. Calyx 4–5-lobed or -parted, the tube free or adnate to the ovary. Petals none or (*Mesembryanthemum*) many and linear. Stamens 3 to many, inserted on the calyx-tube or hypogynous. Styles 3–20; ovary 3–20-celled. Fruit various, either a thin-walled capsule dehiscing loculicidally or septicidally, fleshy and dehiscing by apical stellate valves, or nut-like and indehiscent. Seeds numerous; embryo annular; endosperm scanty or copious.

A family of 19 genera and about 570 species, 400 of which belong to the genus *Mesembryanthemum*, mainly of the southern hemisphere and tropical regions.

Ovary superior; petals none.

Leaves verticillate; calyx-tube wanting or nearly so; capsule loculicidal.

Plants glabrous; stamens 3–5; seeds not strophiolate.

1. *Mollugo*.

Plants pubescent; stamens 5–10; seeds strophiolate.

2. *Glinus*.

Leaves opposite; calyx-tube evident; capsule circumscissile.

Stipules present, scarious; ovary 1–2-celled.

Calyx-lobes unappendaged; stamens 1–3; ovules numerous.

3. *Cypselea*.

Calyx-lobes appendaged on the back toward the apex; stamens 5–10; ovules few.

4. *Trianthema*.

Stipules absent; stamens numerous; ovary 3–5-celled.

5. *Sesuvium*.

Ovary inferior.

Petals none.

6. *Tetragonia*.

Petals many.

7. *Mesembryanthemum*.

1. *MOLLÙGO* L. Sp. Pl. 89. 1753.

Annual, profusely branched herbs, with rosulate, verticillate or alternate leaves. Flowers small, apetalous, axillary or cymose, long-pedicelled. Calyx 5-parted, persistent; sepals scarious-margined. Stamens 3–5, rarely more, hypogynous. Ovary 3-celled, many-seeded. Capsule ovoid, thin-walled, 3-valved, loculicidally dehiscent. Seeds not strophiolate. [The ancient Latin name of some plant, from *mollis* meaning soft.]

About 12 species, mostly natives of tropical regions. Type species, *Mollugo verticillata* L.

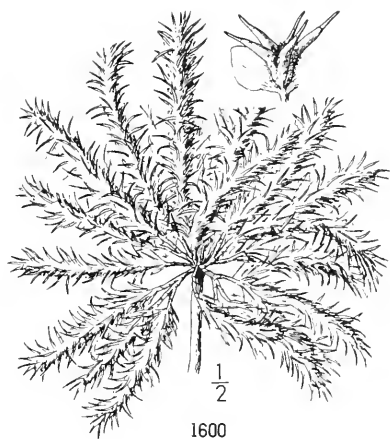
1. *Mollugo verticillàta* L. Carpet-weed. Fig. 1603.

Mollugo verticillata L. Sp. Pl. 89. 1753.

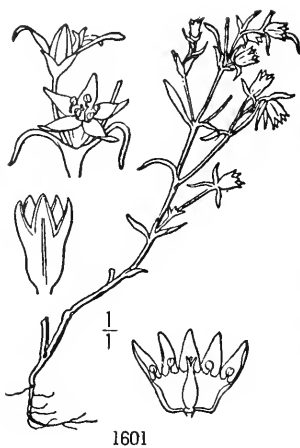
Plant glabrous throughout, the stems dichotomously branched, prostrate, 10–20 cm. long, not succulent. Leaves verticillate, with 5 or 6 in a whorl, 10–25 mm. long, spatulate to narrowly oblanceolate, obtuse, entire, narrowed to a short petiole; flowers axillary; pedicels filiform; sepals 1.5–2 mm. long, oblong; capsule slightly exceeding the sepals; seeds minute, reniform, smooth and shining or slightly granular.

In waste places and cultivated grounds; Washington to New Brunswick, south to Lower California, Mexico, and tropical America where it is native. Type locality: "Habitat in Africa, Virginia." June–Oct. Also called Indian Chickweed.

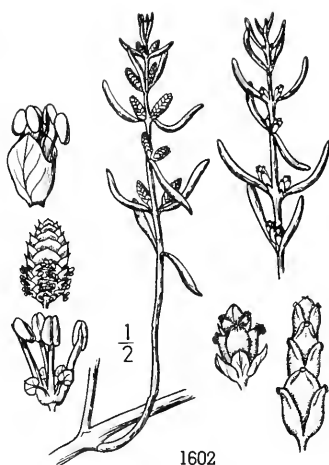
Mollugo Cerviàna (L.) Ser. in DC. Prod. 1: 391. 1824. Annual herb, with numerous ascending branches, 4–20 cm. high. Leaves glaucous, the basal forming a rosette, linear-spatulate, 3–15 mm. long; stem leaves whorled, linear; flowers verticillate; pedicels capillary, often longer than the leaves; sepals about 1 mm. long; capsule subglobose. A weed of warm temperate and tropical regions. Has appeared as a waif in Thomas Valley, Riverside County, California.



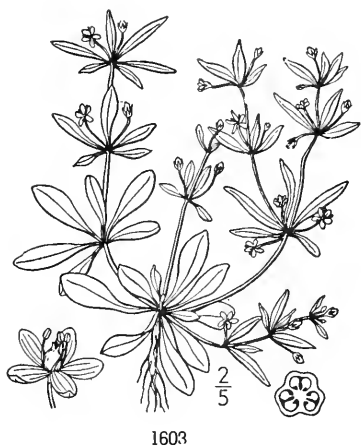
1600



1601



1602



1603



1604



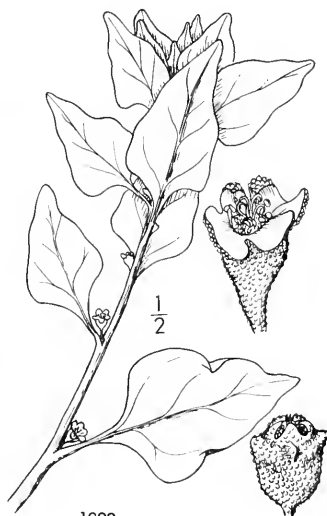
1605



1606



1607



1608

1600. *Cardionema ramosissima*
1601. *Scleranthus annuus*
1602. *Batis maritima*

1603. *Mollugo verticillata*
1604. *Glinus lotoides*
1605. *Cypselea humifusa*

1606. *Trianthema Portulacastrum*
1607. *Sesuvium sessile*
1608. *Tetragonia expansa*

2. *GLINUS* L. Sp. Pl. 463. 1753.

Annuals with the general habit of *Mollugo*, pubescent or glabrous. Leaves verticillate, entire. Flowers in dense clusters, on short peduncles from the upper nodes. Calyx free from the ovary; sepals distinct. Petals none. Stamens 5–10, or rarely more. Fruit a loculicidal 3-celled capsule. Seeds numerous, minute, with a distinct strophiole, the funiculus very large, coiled about the seed. [An ancient Greek name for a kind of maple, the application to these plants not known.]

A genus of 10 species, widely distributed in the tropical and warm temperate regions. Type species, *Glinus lotoides* L.

1. *Glinus lotoides* L. Glinus. Fig. 1604.

Glinus lotoides L. Sp. Pl. 463. 1753.

Plants cinereous-tomentose with branched hairs, the stems diffusely branched from the base, prostrate or ascending. Leaf blades 6–15 mm. long, narrowly to broadly obovate, rounded at the apex, narrowed below to a slender petiole of about equal length; flowers pedicellate or subsessile, in glomerules; sepals 4–7 mm. long, broadly oblong; stamens 5–10; seeds granulated, black.

Locally established in central California, native of the Old World. Type locality: "In Sicilia, Hispania ad fossas." June–Nov.

3. *CYPSELEA* Turpin, Ann. Mus. Paris 7: 219. pl. 121. 1806.

A diminutive prostrate annual, with opposite unequal leaves and scarious stipules. Calyx free from the ovary, with a short campanulate tube, the lobes 4 or 5, unequal, herbaceous. Petals none. Stamens 1–3, alternate with the calyx-lobes. Ovary ovoid or globose, 1-celled; style 2-cleft. Capsule thin-walled, circumscissile. Seeds many, minute, attached to the free central placenta by slender straight persistent funiculi. [Name Greek, meaning beehive, in reference to the fruit, which suggests a beehive.]

A monotypic West Indian genus.

1. *Cypselea humifusa* Turpin. Cypselea. Fig. 1605.

Cypselea humifusa Turpin, Ann. Mus. Paris 7: 219. pl. 121. 1806.

Radiana petiolata Raf. Specchio 1: 88. 1814.

Stems much branched, prostrate, forming mats 2.5–5 cm. wide. Leaves opposite, glabrous, those of each pair unequal, the larger elliptical, 4–5 mm. long, on slender petioles of about equal length, the smaller similar in shape, scarcely half as long and bearing a fascicle of small ones, and a pedicellate flower in its axils; stipules scarious, fimbriate; calyx-lobes ovate, obtuse, 1 mm. long, erect, scarious-margined.

Low ground, locally established; Santa Cruz and the lower San Joaquin River, California. Introduced from the West Indies. July–Aug.

4. *TRIANTHEMA* L. Sp. Pl. 223. 1753.

Annual or perennial herbs or shrubs, the stems usually branched at the base and spreading. Leaves opposite, those of each pair unequal. Stipules present. Flowers solitary in the axils. Calyx-tube free from the ovary, 5-lobed. Petals none. Stamens 5 or 6, sometimes 10, perigynous, alternating with the calyx-lobes when the same number. Ovary 2-celled or often 1-celled by suppression, truncate; styles 1 or usually 2; ovules 1 to few, basal. Capsule cylindrical or turbinate, tardily circumscissile, somewhat leathery above, usually with 2 marginal wing-like crests partly or wholly enclosing the apex. [Name Greek, meaning three and flower in allusion to the stamens.]

A genus of 15 species; all but the following, which is the type, are in the tropical regions of the Old World.

1. *Trianthema Portulacastrum* L. Horse Purslane. Fig. 1606.

Trianthema Portulacastrum L. Sp. Pl. 223. 1753.

Trianthema monogyne L. Mant. 1: 69. 1767.

Portulacastrum monogynum Medic. Phil. Bot. 1: 99. 1789.

Annual succulent herb, glabrous, branching from the base, the branches decumbent, 1–3 dm. long. Leaves orbicular-obovate, or the smaller narrower, 15–25 mm. long, with smaller ones on the axillary branchlets; petioles about equaling the blade, dilated at base; stipules scarious, entire; flowers sessile and usually solitary in the axils; calyx-lobes lanceolate, 2.5 mm. long, colored, with a dorsal mucronation near the apex; capsule 4 mm. long, cylindrical, somewhat curved, the winged appendages at the apex prominent.

Sandy soils, Lower Sonoran Zone; Imperial Valley, California, to Texas and Florida, south to Lower California, Mexico, and the West Indies. Type locality: Jamaica. June–Nov.

5. *SESŪVIUM* L. Syst. Nat. ed. 10. 1058. 1759.

Annual or perennial herbs or undershrubs, with fleshy opposite leaves and no stipules. Flowers solitary in the axils, sessile or on short stout pedicels. Calyx-tube turbinate,

adnate below to the ovary. Calyx-lobes 5, usually horned on the back near the apex. Petals none. Stamens 1 to many, perigynous, sometimes slightly united into phalanges. Ovary half superior, 3–5-celled, with as many styles. Capsule membranaceous, 3–5-celled, ovoid, circumscissile at the middle. Seeds several or many in each cell, minute, smooth. [Etymology of the name uncertain.]

Five species, widely distributed but mainly maritime. Type species, *Sesuvium Portulacastrum* L.

1. *Sesuvium sessile* Pers. Western Sea Purslane. Fig. 1607.

Sesuvium sessile Pers. Syn. Pl. 2: 39. 1807.

A glabrous and fleshy annual, the stems much branched, prostrate or ascending. Leaves broadly spatulate or linear, 1–4 cm. long; flowers sessile or nearly so, 6–12 mm. wide; calyx-lobes ovate-lanceolate, 6 mm. long, scarious-margined, short-horned near the apex; stamens numerous, filaments red, united below; capsule about equaling the calyx.

Low saline soils, Sonoran Zones; Sacramento Valley, California, to Lower California, east to Utah, Kansas, Texas, and northern Mexico; also southern Brazil. Type locality: not stated. May–Nov.

6. TETRAGONIA L. Sp. Pl. 480. 1753.

Fleshy annual or perennial herbs or undershrubs, with alternate leaves and no stipules. Flowers axillary and terminal. Calyx-tube becoming adnate to the ovary, fleshy; the lobes or teeth usually 4, connivent after anthesis. Stamens one to many, perigynous, sometimes more or less united at the base into phalanges. Ovary at length wholly inferior, 3–9-celled; styles as many as the cells; ovules 1 in each cell. Fruit a somewhat 4–6-horned, hard nut. Seeds solitary and pendant in the indehiscent cell; embryo horse-shoe-shaped. [Name Greek, meaning four and knee or angle, in reference to the fruit.]

A genus of about 60 species of the southern hemisphere, chiefly South Africa, and of littoral habitat. Type species, *Tetragonia fruticosa* L.

1. *Tetragonia expansa* Murr. New Zealand Spinach. Fig. 1608.

Tetragonia expansa Murr. Commentat. Gott. 6: 13. 1785.

Succulent annual with procumbent or spreading branches, covered with glistening fleshy papillae. Leaves deltoid-ovate, abruptly contracted to a broad petiole; flowers axillary and usually solitary, subsessile; calyx-tube urceolate, the lobes triangular, 1.5–2.5 mm. long, yellowish on the inner surface; stamens 7–13; ovary 5–9-celled; styles 3 or more; nut angled, 8–10 mm. broad, 2–5-horned.

Seacoast, on cliffs, sandy beaches and ballast. Portland, San Francisco, and Monterey. Native of New Zealand and eastern Asia. April–Sept.

7. MESEMBRYANTHEMUM L. Sp. Pl. 480. 1753.

Mostly very succulent annual or perennial herbs or shrubs, with opposite or alternate leaves and no stipules. Flowers terminal or axillary, often showy. Calyx-tube adnate to the ovary; the lobes 5, unequal, herbaceous. Petals numerous, linear. Stamens very numerous, with slender filaments, inserted with the petals on the calyx-tube. Ovary 5–20-celled; styles as many as the cells; ovules many in each cell. Capsule fleshy, dehiscing, when wetted, at the depressed summit by stellate valves. Seeds minute, many. [Name Greek, meaning mid-day and flower.]

About 400 species, mostly African. Type species, *Mesembryanthemum nodiflorum* L.

Leaves alternate; herbage covered with crystalline papillae; fruit a 5-valved capsule, each valve with a broad wing on each margin and a central keel.

Leaves linear and nearly terete.

Leaves flat, ovate to broadly spatulate.

Leaves opposite, 3-angled; herbage glabrous; fruit fleshy, indehiscent.

1. *M. nodiflorum*.

2. *M. crystallinum*.

3. *M. chilense*.

1. *Mesembryanthemum nodiflorum* L. Slender-leaved Ice-plant. Fig. 1609.

Mesembryanthemum nodiflorum L. Sp. Pl. 480. 1753.

Cryophytum nodiflorum L. Bolus, S. Afr. Gard. 17: 326. 1926.

Annual, covered with colorless shining papulae, the stems branched from the base, ascending or prostrate, 5–20 cm. long. Leaves alternate, terete, 10–25 mm. long, scarcely 2 mm. thick; flowers solitary in the axils, short-pedicelled, about 1 cm. broad; petals white; ovary 5-celled.

Bluffs or low ground along the seashore; Los Angeles County, Santa Catalina and San Clemente Islands, to Lower California; also South Africa and the Mediterranean region. The three indigenous species here described were probably introduced into California by natural means before the advent of white men. April–Nov.

2. *Mesembryanthemum crystallinum* L. Common Ice-plant. Fig. 1610.

Mesembryanthemum crystallinum L. Sp. Pl. 480. 1753.

Cryophytum crystallinum N. E. Brown ex E. P. Phillips, Gen. Afr. Pl. 245. 1926.

Fleshy annual, densely covered with transparent shining papulae, the stems dichotomously branched, prostrate, 2–4 dm. long. Leaves flat, broadly ovate or spatulate, 2–4 cm. long, undulate,

clasping; flowers axillary, sessile or nearly so; calyx-tube campanulate, 6–10 mm. long; petals white or tinged with rose, capsule 5-celled.

Usually in saline soil near the coast; Monterey County to Lower California, and locally in the interior valleys and deserts of southern California; also Canary Islands, Mediterranean region, and South Africa. Type locality: "Habitat in America?" March–Oct.

Mesembryanthemum cordifolium L. f. Suppl. 260. 1781. Leaves opposite, flat, ovate with a rounded or cordate base, finely papillate; flowers about 15 mm. broad; calyx-lobes 4; capsule 4-valved, the valves without wings on the margins.

Locally naturalized along the coast of Oregon and California. Native of South Africa.

3. *Mesembryanthemum chilense* Molina. Sea Fig. Fig. 1611.

Mesembryanthemum chilense Molina, Sagg. Chile ed. 2. 133. 1810.

Mesembryanthemum dimidiatum Torr. Pacif. R. Rep. 4: 75. 1857.

Carpobrotus chilensis N. E. Brown, Journ. Bot. 66: 324. 1928.

Smooth glabrous perennial, the stems prostrate, rooting at the nodes, often forming extensive mats. Leaves 3-angled, 4–7 cm. long, 10–15 mm. thick, very succulent; flowers solitary, terminal, sessile or nearly so, 3–5 cm. broad; calyx-tube turbinate, 2–4 cm. long, the larger foliaceous lobes nearly as long; petals magenta; ovary 8–10-celled.

Sand dunes and bluffs along the seashore, Transition and Sonoran Zones; Point Blanco, Oregon, to Lower California; also Chile, Australia, and Tasmania. Type locality: sandy shores of Chile. April–Sept.

This species has been confused in the California floras with the African species *M. aequilaterale* Haw.

Mesembryanthemum edule L. Syst. Nat. ed. 10. 1060. 1759. (Hottentot Fig.) Closely resembling *M. chilense* in vegetative characters, but leaves longer, brighter green, and the flowers larger, 8–10 cm. in diameter; petals yellow or red-purple. Frequently planted on banks for erosion protection or as a sand binder, becoming naturalized in central and southern California. Native of South Africa.

Family 42. PORTULACACEAE.*

PURSLANE FAMILY.

Perennial or annual herbs, with or without stipules, more or less succulent, rarely somewhat woody. Leaves alternate, opposite or basal, entire. Flowers perfect, regular or nearly so. Sepals commonly 2, rarely more, sometimes cohering at the base. Petals 3–16, generally hypogynous, entire or emarginate, quickly withering, often more or less united at the base. Stamens few to many, opposite the petals when of the same number and usually adnate to their bases; anthers versatile. Ovary commonly superior, 1-celled with few to many ovules on a free central or basal placenta; styles 2–8-cleft or distinct. Fruit a capsule circumscissile or dehiscent by 2 or 3 valves. Seeds 1 to many, mostly round-reniform to orbicular, somewhat compressed, often strophiolate; embryo curved.

About 20 genera and 220 species, widely distributed but most abundant in temperate regions.

Capsule 2–3-valved, dehiscent from the apex.

Sepals deciduous.

Sepals persistent.

Capsule dehiscent by 3 valves; inflorescence not secund or rarely inconspicuously so.

Seeds 18–35; stem leaves alternate.

Seeds 1–6; stem leaves for the most part opposite.

Plants with deep-seated corms or fleshy roots; ovules 6.

Plants with fibrous roots or reproducing by runners or bulblets; ovules 3.

Capsule dehiscent by 2 valves; inflorescence secund.

Style long, filiform; petals in drying twisting about the style.

Style very short; petals on drying folding as a cap over the capsule.

Capsule circumscissile.

Ovary completely superior; capsule splitting upward from the line of dehiscence.

Ovary partly inferior; upper part of the capsule not splitting.

1. *Talinum*.

2. *Calandrinia*.

3. *Claytonia*.

4. *Montia*.

5. *Spraguea*.

6. *Calyptidium*.

7. *Lewisia*.

8. *Portulaca*.

1. *TALINUM* Adans. Fam. Pl. 2: 245. 1763.

Herbaceous plants, sometimes suffrutescent at the base, often from a tuberous root. Leaves usually alternate, exstipulate, the blades flat or terete. Flowers in cymes or solitary in the leaf axils. Sepals 2, deciduous. Petals usually 5, soon withering. Stamens as many or more than the petals. Style 3-lobed or -cleft. Capsules 3-valved. Seeds many, flattened, round-reniform. [Aboriginal name of a Senegal species.]

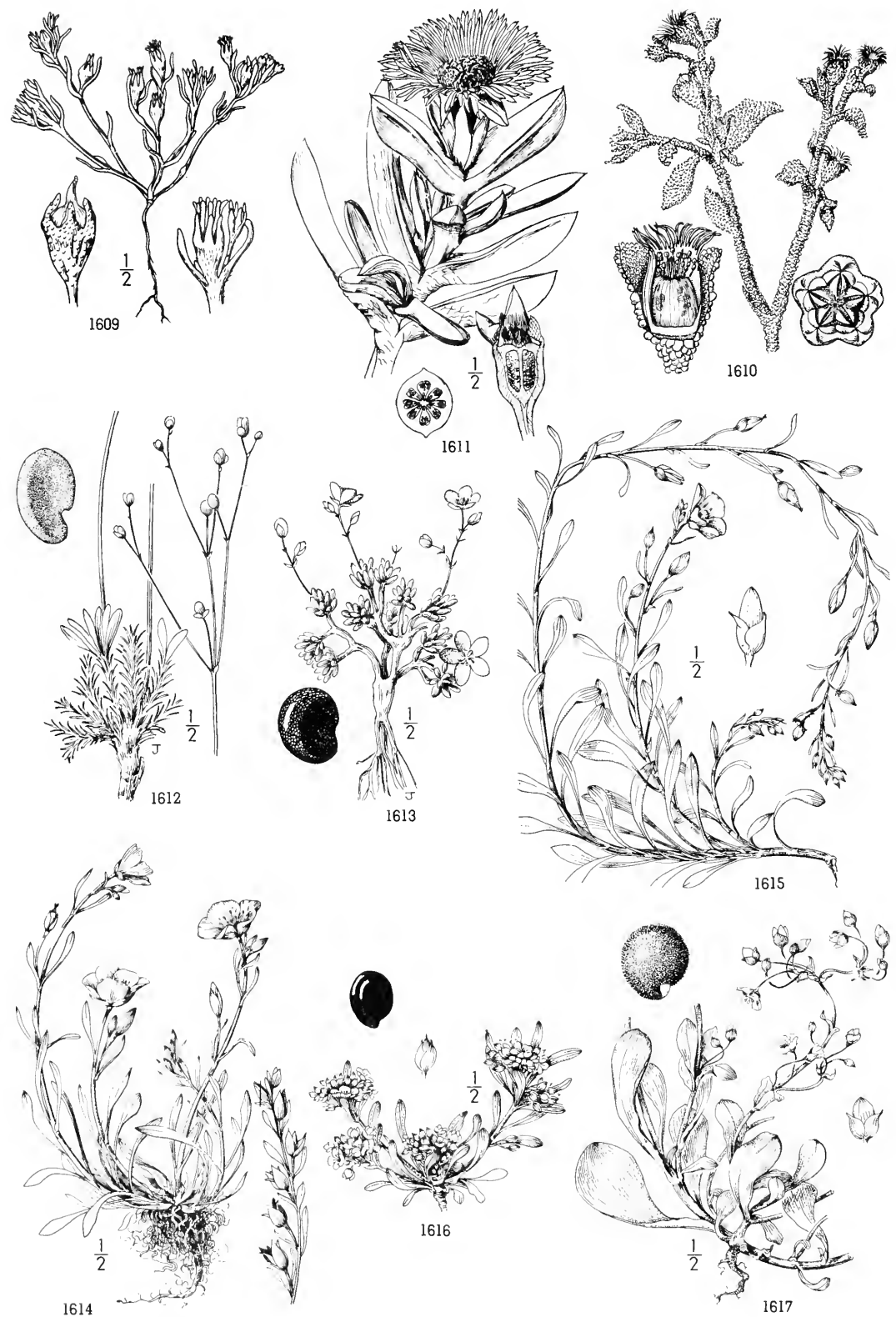
About 50 species mostly natives of America, but also occurring in Asia and Africa. Type species, *Portulaca triangularis* Jacq.

Midribs of the leaves persistent on branches of the caudex, spinescent, woody; inflorescence 10–25 cm. long.

1. *T. spinescens*.

Midribs of leaves scarcely persistent, if so, not at all spiny; inflorescence 2.5–3.5 cm. long. 2. *T. okanoganense*.

* Text prepared by Roxana Stinchfield Ferris.



1609. *Mesembryanthemum nodiflorum*
1610. *Mesembryanthemum crystallinum*

1611. *Mesembryanthemum chilense*
1612. *Talinum spinescens*
1613. *Talinum okanoganense*
1614. *Calandrinia ciliata*

1615. *Calandrinia Breweri*
1616. *Calandrinia ambigua*
1617. *Calandrinia maritima*

1. *Talinum spinescens* Torr. Spiny Talinum. Fig. 1612.

Talinum spinescens Torr. Bot. Wilkes Exp. 250. 1874.

Claytonia spinescens Kuntze, Rev. Gen. Pl. 57. 1891.

Perennial herbs 12–30 cm. high, with a branched woody caudex covered with the persistent spine-like midribs of leaves. Leaves green, fleshy, linear, obtuse at the apex, 1.5–2.5 cm. long, crowded on the short caudex; inflorescence 10–25 cm. long, of elongated bracteate 6–12-flowered cymes; petals 7 mm. long, magenta; sepals orbicular, 2–4 mm. long; stamens 20–30, capsule ovoid-globose, 4–5 mm. long; seeds many, black, not shining.

Rocky places, Arid Transition Zone; central Washington from Okanogan County south to the Oregon border. Type locality: upper Columbia River, Okanogan County, Washington. June–Aug.

2. *Talinum okanoganense* English. Okanogan Talinum. Fig. 1613.

Talinum okanoganense English, Proc. Biol. Soc. Wash. 47: 191. 1934.

Talinum Wayae Eastw. Leaflets West. Bot. 1: 139. 1934.

Perennial from thickened root with spreading caespitose branches 2–5 cm. long. Leaves gray-green, terete, 4–12 mm. long; inflorescence 2.5–3.5 cm. long, of 2–9-flowered bracteate corymbs; petals white, tinged with yellow or pink, 7–8 mm. long; sepals ovate, mucronate, 4 mm. long; stamens about 20; capsule ovoid, 2–3 mm. long; seeds many, black, shining.

In rocks, Canadian and Hudsonian Zones; mountains of southern British Columbia south to Okanogan County, Washington. Type locality: eastern Okanogan County, Washington. May–Aug.

2. CALANDRÍNIA H.B.K. Nov. Gen. & Sp. 6: 77. pl. 526. 1823.

Annual or perennial herbs with alternate leaves and ephemeral flowers in bracted racemes or panicles. Sepals 2, persistent. Petals 3–7, usually 5, rose-red or white. Stamens 3–14, shorter than the petals, not equaling them in number. Style short, stigmas 3-lobed or -divided. Capsule membranous or chartaceous, 3-valved, splitting from the apex. Seeds somewhat flattened, many, dark, usually with minute markings, strophiolate or naked. [Name in honor of J. L. Calandrini, a Swiss botanist of the 18th century.]

About 150 species; natives of western North and South America and of Australia. Type species, *Calandrinia caulescens* H.B.K.

Inflorescence not a loose naked cyme, flowering branches leafy; seeds shining.

Herbage green; flowers in racemes, petals rose-red.

Capsule enveloped by the fruiting calyx.

Capsule nearly twice the length of the fruiting calyx.

Herbage glaucous; flowers in clustered panicles, petals white.

Inflorescence a loose naked cyme, flowering branches scape-like; seeds dull.

1. *C. ciliata* Menziesii.

2. *C. Breweri*.

3. *C. ambigua*.

4. *C. maritima*.

1. *Calandrinia ciliata* var. *Menziesii* (Hook.) J. F. Macbride. *Calandrinia*, Red Maids. Fig. 1614.

Talinum Menziesii Hook. Fl. Bor. Amer. 1: 223. 1834.

Calandrinia elegans Spach, Hist. Veg. 5: 232. 1836.

Calandrinia caulescens var. *Menziesii* A. Gray, Proc. Amer. Acad. 22: 277. 1887.

Calandrinia ciliata var. *Menziesii* J. F. Macbride, Field Mus. Bot. Ser. 11: 20. 1931.

Annual, 0.5–2 dm. high with many ascending branches, herbage nearly glabrous to coarsely ciliate. Leaves linear-oblong or oblanceolate; inflorescence racemose, the pedicels 4–10 mm. long; sepals 4–6 mm. long, keeled, often ciliate on midrib and margins; petals 5 rose-red, 4–8 mm. long; stamens 7–14; style 3-parted; capsule 4–5 mm. long; seeds many, black, shining, minutely tuberculate.

In open places, very common on cultivated ground, Upper Sonoran and Transition Zones; British Columbia to Lower California and east to Arizona and Sonora, Mexico. Type locality: south of the Columbia River, Feb.–May. A variable species as to size of flowers and habit of growth. Several segregates have been proposed by Rydberg [N. Amer. Fl. 21: 292–293. 1932.].

2. *Calandrinia Breweri* S. Wats. Brewer's *Calandrinia*. Fig. 1615.

Calandrinia Menziesii var. *macrocarpa* A. Gray, Proc. Calif. Acad. 3: 102. 1864.

Calandrinia Breweri S. Wats. Proc. Amer. Acad. 11: 124. 1876.

Glabrous annuals with lax branches 1–4 dm. long, ascending or trailing. Leaves ovate-lanceolate or spatulate, 1–3 cm. long, the upper sometimes coarsely ciliate; inflorescence racemose, few-flowered; pedicels 7–10 mm. long, typically reflexed in fruit; sepals angled glabrous or occasionally coarsely ciliate on the margins and midrib, 5–8 mm. long, ovate, acute; petals rose-red, 4–5 mm. long; stamens 5–7; style short, stigma 3-lobed; capsule 9–11 mm. long; seeds many, strophiolate, black, shining, minutely tuberculate.

Hill slopes, Upper Sonoran Zone; central California south to northern Lower California. A widely distributed species but not common. Type locality: Santa Ynez Mountains, Santa Barbara County, California. April–June.

3. *Calandrinia ambigua* (S. Wats.) Howell. Desert *Calandrinia*. Fig. 1616.

Claytonia ambigua S. Wats. Proc. Amer. Acad. 17: 365. 1882.

Calandrinia sesuvioides A. Gray, Proc. Amer. Acad. 22: 278. 1887.

Calandrinia ambigua Howell, Erythra 1: 34. 1893.

Glaucous, succulent annuals, depressed and spreading, with several branches. Leaves linear-spatulate, 1–3.5 cm. long, mostly scattered along the stems; flowers in lateral or terminal com-

pact clusters; pedicels 1-3 times the length of the calyx; sepals 4-6 mm. long, with narrow scarious margins, ovate, obtuse; petals white, 3-5, obovate, shorter than or equaling the sepals; stamens 5-8; stigma subcapitate, undivided; capsule 5-6 mm. long; seeds numerous, not strophiolate, black, shining, the surface scarcely marked.

Widely distributed in alkaline areas, Lower Sonoran Zone; the Death Valley region south through the Mojave and Colorado Deserts to Lower California. Type locality: El Rio on the Colorado River, California. March-May.

4. *Calandrinia marítima* Nutt. Seaside Calandrinia. Fig. 1617.

Calandrinia marítima Nutt. in Torr. & Gray, Fl. N. Amer. 1: 197. 1838.

Claytonia marítima Kuntze, Rev. Gen. Pl. 57. 1891.

Glaucous, basally branching annuals 5-30 cm. high with scape-like stems. Basal leaves spatulate, 1-5 cm. long, the cauline reduced or none; inflorescence in terminal loose cymes; sepals ovate, dark-veined, shortly acute, 4-5 mm. long; petals 3-5, 3.5-5 mm. long, rose-red; stamens 4-8; style short, stigmas 3; capsule ovate, 4.5-6 mm. high; seeds dark, dull, minutely roughened, strophiolate.

Seacoast, Upper Sonoran Zone; Santa Barbara County, California, to Lower California. Type locality: San Diego, California. March-May.

CLAYTONIA L. Sp. Pl. 204. 1753.

Glabrous perennial herbs with deep-seated corms or fleshy roots. Basal leaves 1 to many, cauline leaves 2, opposite or nearly so, a third leaf rarely present. Inflorescence terminal, racemose or subumbellate, 1-2 bracts present at the base of the raceme. Flowers perfect, regular. Sepals 2, persistent, herbaceous. Petals 5-6, variable in width, hypogynous, pink, white or yellowish. Stamens 5, adnate to the petals. Ovules 6, styles 3, united at the base, free at the apex. Capsule ovate, 3-valved, the valve margins involute in age. Seeds 2-6, dark, shining, smooth or faintly marked. [In honor of John Clayton, American botanist of the 18th century.]

About 15 species, native of North America and the arctic regions. Type species, *Claytonia virginica* L.

Plants with globose corms; basal leaves 1 or wanting.

Stem leaves thick, obtuse or rounded.

1. *C. umbellata*.

Stem leaves thin, acute or acuminate.

2. *C. lanceolata*.

Plants with rootstocks or fleshy taproot; basal leaves several to many.

Plants with elongate caudices 1-3 cm. broad with crowded basal leaves.

Scapes after flowering slightly surpassing the basal leaves; petals cuneate, 10-12 mm. long.

3. *C. nivalis*.

Scapes after flowering shorter than the basal leaves; petals clawed, 6-8 mm. long.

4. *C. bellidifolia*.

Plants with fleshy rootstocks, basal leaves several.

5. *C. nevadensis*.

1. *Claytonia umbellata* S. Wats. Great Basin Claytonia. Fig. 1618.

Claytonia umbellata S. Wats. Bot. King Expl. 43. 1871.

Claytonia obovata Rydb. N. Amer. Fl. 21: 299. 1932.

Perennial from a globose or globose-depressed corm 1.5-2.2 cm. in diameter, the stem mostly subterranean. Basal leaf thick, ovate to obovate, the petiole two-thirds the length of the stem; cauline leaves opposite, thick, 3-nerved, 1.5-2.5 cm. long, the petiole one-fourth the length of the blade or equaling it, oval to obovate, rounded or obtuse at the apex; inflorescence subumbellate or corymbose, shorter than the leaves; sepals obtuse, 4-5 mm. long; petals 5, white or pink, obovate, entire, 6-7 mm. long; seeds dark, shining.

Exposed slopes, Transition to Canadian Zones; southern Oregon south on the east slope of the Sierra Nevada to El Dorado County, California, and in adjacent Nevada. Type locality: Mount Davidson and Truckee Pass, Nevada. June-July.

2. *Claytonia lanceolata* Pursh. Western Spring Beauty. Fig. 1619.

Claytonia lanceolata Pursh, Fl. Amer. Sept. 175. 1814.

Perennial from a globose corm 1-2 cm. broad with 1 to several stems 7-15 cm. high arising from the corm. Basal leaves 1-2, sometimes absent, 5-8 cm. long, the blade shorter than the petiole; stem leaves 2 subtending the inflorescence (a third leaf rarely present on a branched inflorescence), broadly or narrowly oblanceolate to ovate, acute, 2.5-7 cm. long, sessile or attenuate at the base into a short petiole; inflorescence 4-15-flowered, subumbellate or racemose, occasionally branched, pedicels 5-8 mm. long, recurved in fruit, the lowest branches of the raceme bracteate; sepals ovate, entire to obscurely repand, 3-3.5 mm. long; petals 5-6, 6-12 mm. long, retuse or obtuse, pink or white with pink lines or yellowish; capsule ovoid, 4 mm. high; seeds 4-6, black, smooth, shining.

In woods and meadows, upper Transition and Boreal Zones, British Columbia and Alberta, south to the mountains of northern New Mexico and northern California. Type locality: "Rocky Mountains." May-July.

Claytonia lanceolata var. *sessilifolia* (Torr.) A. Nels. Bull. Torrey Club 27: 259. 1900. Leaves mostly linear-lanceolate, usually surpassing the inflorescence, sepals rarely toothed, petals 6-8 mm. long. Southern Oregon south in the Sierra Nevada to Plumas County, California. In its northern limit more nearly approaching the species.

Claytonia lanceolata subsp. *chrysántha* (Greene) Ferris. (*Claytonia chrysantha* Greene, Leaflets Bot. Obs. 2: 45. 1910.) Leaves ovate, 2.5-4 mm. long, petals yellow. Northern Cascade Mountains, Washington.

Claytonia lanceolata var. *Piersónii* Munz & Jtn. Bull. Torrey Club 49: 352. 1923. Leaves short-petiolate, widest below the middle, axis of raceme shortened so that the flowers appear umbellate. San Gabriel Mountains, southern California.

3. *Claytonia nivàlis* English. Wenatchee Claytonia. Fig. 1620.*Claytonia nivàlis* English, Proc. Biol. Soc. Wash. 47: 189. 1934.

Perennial, with stout taproot and thick, sometimes branched caudex 1–2 cm. in diameter. Basal leaves many, very fleshy, 1-nerved, spatulate, rounded or rarely acute at apex, cuneate at base, 3–8 cm. long; petioles 2–6 cm. long, not winged above, with enlarged scarious base; stems several, 4–9 cm. long, with 2 subopposite linear leaves 1 cm. long; inflorescence corymbiform, 3–10-flowered; pedicels subtended by lanceolate bracts; sepals somewhat unequal, ovate, 8–11 mm. long; petals 5, rose-colored, cuneate, rounded or nearly truncate at apex, 12–14 mm. long; stamens 5; ovules 6; capsule ovate, 4–5 mm. high; seeds 2–3, 2 mm. long, black, shining, faintly muriculate.

Loose rock, talus slopes, Hudsonian to Arctic-Alpine Zones; Wenatchee Mountains, Washington. Type locality: Ingalls Peak, Washington. July–Aug.

4. *Claytonia bellidifolia* Rydb. Rydberg's Claytonia. Fig. 1621.*Claytonia bellidifolia* Rydb. N. Amer. Fl. 21: 301. 1932.

Perennial with stout taproot and thick caudex 2–12 cm. long and 1–3 cm. broad. Basal leaves crowded, fleshy, faintly pinnate-nerved, 4.5–10 cm. long, the petioles 3–8 mm. long, but little winged, with a broad scarious base, the blades broadly oblanceolate to obovate, acute or rounded at the apex; stem leaves subtending the inflorescence, subopposite, linear to linear-lanceolate, bract-like; stems several, shorter than the leaves; inflorescence 2–6-flowered, corymbiform; pedicels usually with short lanceolate scarious bracts; sepals ovate, acute, 5 mm. long; petals 5, white to pale pink in age, slightly dissimilar in width, narrowed to a broad claw, acute or somewhat rounded at the apex, 6–7 mm. long; stamens 5; styles filiform, 3-cleft, 2.3 mm. long; ovules 6; capsule ovate, 4–4.5 mm. high; seeds usually 4, 2 mm. long, minutely tuberculate, sometimes only on the margin.

In loose rock or gravel, talus slopes, Hudsonian to Arctic-Alpine Zones; central Cascade and Wallowa Mountains of Oregon, south to Mariposa County, California, and east to Yellowstone National Park, Wyoming. Type locality: Wallowa Mountains, Oregon. July–Aug.

5. *Claytonia nevadensis* S. Wats. Sierra Claytonia. Fig. 1622.*Claytonia nevadensis* S. Wats. ex Brewer & Wats. Bot. Calif. 1: 77. 1876.*Claytonia chenopodina* Greene, Leaflets Bot. Obs. 2: 271. 1912.*Montia alpina* Eastw. Leaflets West. Bot. 1: 11. 1932.

Perennial, 5–12 cm. high, arising from tangled fleshy but slender rootstocks. Basal leaves fleshy, 5–10 cm. long, the petioles 3.5–8 cm. long, but little enlarged at the base, the blades 1.5–2 cm. broad, obovate to suborbicular, abruptly narrowed at the base; stem leaves 7–15 mm. long, sessile, ovate, subtending the subumbellate or short racemose inflorescence; flowers 2–6, white with a pink center, occasionally the lower flower bracteate; sepals ovate, acute, 5–6 mm. long; petals 5–8 mm. long, somewhat variable in width, spatulate with a narrow claw; stamens shorter than the petals; style 2.5–3 mm. long, 3-cleft; ovules 6; capsule ovoid, 3–3.5 mm. long; seeds 4–6, black, shining.

In gravelly soil, Arctic-Alpine Zone; Sierra Nevada from Tuolumne County south to Mono County, California. Type locality: Mount Dana, California. July–Aug.

4. MONTIA L. Sp. Pl. 87. 1753.

Annuals or perennials with rootstocks and propagating by stolons or bulblets. Leaves more or less fleshy, opposite, alternate or basal. Inflorescence racemose or paniculate, bractless, with bracts or leafy. Pedicels enlarged at the base of the flower, commonly recurved in fruit. Sepals 2, usually a little unequal, persistent. Petals 2–5, sometimes 6, often unequal in length and width, pink or white, partially united at the base or free. Stamens 2–5. Ovules 3, rarely 4. Styles 3, united, 3-parted above. Capsule globose to ovoid, 3-valved, the valves involute and spreading in age. Seeds 1–3, smooth, tuberculate, muricate or foveolate, usually shining. [Name in honor of G. Monti, Italian botanist of the 18th century.]

About 40 species, natives of both hemispheres. Type species: *Montia fontana* L.

Stem leaves alternate, more than 2.

Thick-leaved perennials reproducing by runners or bud scales.

Thin-leaved annuals.

Panicles leafy; stamens 5.

Racemes not leafy, bractless except at the base; stamens 3.

Inflorescence terminal, longer than the leaves; petals 4–5.

Flowers 6–12 in each crowded raceme.

Flowers 2–7 in each open raceme.

Inflorescence axillary, shorter than the leaves; petals 2 or wanting.

Stem leaves opposite, one pair only except in *M. fontana* and *M. Chamissoi*.

Petals united above the base, the 3–5-lobed corolla split on one side.

Petals free or united only at the base.

Stems with 2 to several pairs of leaves; the inflorescence axillary or terminal. 7. *M. Chamissoi*.

Stems with a single pair of leaves subtending the terminal inflorescence.

Pedicels of the inflorescence bractless or with a single bract at the lowest branch.

1. *M. parvifolia*.2. *M. diffusa*.3. *M. dichotoma*.4. *M. linearis*.5. *M. Howellii*.6. *M. fontana*.

- Perennials with a horizontal rootstock; petals 8.5–12 mm. long. 8. *M. cordifolia*.
 Annuals; petals 2–7 mm. long.
 Stem leaves not united; seeds (under lens) distinctly foveolate. 9. *M. saxosa*.
 Stem leaves united at least on one side; seeds (under lens) more or less minutely granulate with low tubercles.
 Stem leaves united on both sides forming a rounded though often angled disk. 10. *M. perfoliata*.
 Stem leaves united on one side, free above the base or forming a 2-lobed disk.
 Racemes 3–12 cm. long, the peduncle one-third to one-half the length of the raceme; petals 5–7 mm. long. 11. *M. gypsophioides*.
 Racemes 0.5–2.5 cm. long, subsessile or with short peduncle; petals 2.5–5 mm. long. 12. *M. spathulata*.
 Pedicels of the inflorescence bracteate.
 Floral bracts minute, 1–3 rarely 4 mm. long; plants annual. 13. *M. arenicola*.
 Floral bracts 4–10 mm. long; plants perennial.
 Stem leaves sessile; plant reproducing by bulb scales or from persistent root crown. 14. *M. sibirica*.
 Stem leaves petioled; plants reproducing by tuber-bearing rootstock. 15. *M. heterophylla*.

1. *Montia parvifolia* (Moc.) Greene. Small-leaved *Montia*. Fig. 1623.

Claytonia parvifolia Moc. ex DC. Prod. 3: 361. 1828.
Claytonia filicaulis Dougl. ex Hook. Fl. Bor. Amer. 1: 224. 1832.
Montia parvifolia Greene, Fl. Fran. 181. 1891.
Montia obtusata Heller, Muhlenbergia 2: 32. 1905.
Naiocrene parvifolia Rydb. Bull. Torrey Club 33: 139. 1906.

Perennial with branched fleshy rootstock, short caudices and decumbent or widely divaricate branches, 1–3 dm. long, often flagelliform and developing stolons. Leaves obovate to oblanceolate, 1–3.5 cm. long, petiole enlarged and scarious at the base, usually longer than the blade, more or less fleshy (thick and *Sedum*-like in exposed plants), clustered at the base and alternate on the stems, becoming reduced and bract-like above and bearing offshoots in the axils; flowers 1–10, racemose at the ends of the branches, white flushed with pink to bright pink; petals 5, 7–8 mm. long, round or retuse at the apex; sepals 2–2.5 mm. long, unequal in size, rounded, the larger sepal sometimes lobed; ovules 3; capsule 2.5–3 mm. long; seeds 1–2, black, granulate.

Mossy banks by streams and springs, Transition and Canadian Zones; Alaska south through Pacific States to the Santa Lucia Mountains, Monterey County, California. Type locality: Nootka, British Columbia. May–July.

Montia parvifolia subsp. *flagellaris* (Bong.) Ferris. (*Cloytonia flagellaris* Bong, Mém. Acad. St. Pétersb. VI. 2: 137. 1832; *Montia Sweetseri* Henderson, Rhodora 32: 24. 1930.) Petals pink, 12–14 mm. long, basal leaves 2–4 cm. long. Tillamook and Curry Counties, Oregon. Type locality: Sitka, Alaska.

2. *Montia diffusa* (Nutt.) Greene. Diffuse *Montia*. Fig. 1624.

Claytonia diffusa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 202. 1838.
Montia diffusa Greene, Fl. Fran. 181. 1891.
Limalisine diffusa Rydb. N. Amer. Fl. 21: 295. 1932.

Leafy annual, 5–20 cm. high, diffusely much branched from the base. Basal and cauline leaves similar, the blades ovate to deltoid, decurrent on the long petiole; inflorescence terminal, paniculate, bracteate below, 4–8-flowered; sepals obovate, rounded, entire, 1.7–2 mm. long; petals 5, white or pinkish, emarginate, 3–4 mm. long; stamens 5; ovules 3; capsule obovate, a little surpassing the sepals; seeds 1–3, black, 1–1.3 mm. long, finely marked with regular reticulations.

In woods, Transition Zone; Washington, south to Marin County, California. Type locality: Fort Vancouver, Washington. May–July.

3. *Montia dichotoma* (Nutt.) Howell. Dichotomous *Montia*. Fig. 1625.

Claytonia dichotoma Nutt. in Torr. & Gray, Fl. N. Amer. 1: 202. 1838.
Montia dichotoma Howell, Erythra 1: 36. 1893.
Montiastrum dichotomum Rydb. N. Amer. Fl. 21: 296. 1932.

Slender annual, 2.5–6 cm. high, with simple stems or with few branches from the base. Leaves alternate, linear, 7–15 mm. long, with enlarged scarious clasping bases; racemes subtended by broad, ovate scarious bracts, 1–2 on the ends of the branches, second, 1–2 cm. long with 6–12 rather crowded nodding flowers; pedicels 3–6 mm. long; sepals 1.8–2 mm. long, rounded ovate, 7–9-veined, the upper margin white; petals 4–5, emarginate or truncate at the apex, unequal in length and width, the longest petal but little surpassing the sepals; stamens 3–4; capsule ovoid, narrowed at the base, 2 mm. long; seeds 3, 1 mm. long, black, not dull, faintly but finely reticulate.

Moist slopes, Upper Sonoran and Arid Transition Zones; Klickitat County, Washington, south to Shasta County, California, and east to Idaho. Type locality: near the mouth of the Willamette River, Oregon. April–May.

4. *Montia linearis* (Dougl.) Greene. Linear-leaved *Montia*. Fig. 1626.

Claytonia linearis Dougl. ex Hook. Fl. Bor. Amer. 1: 224. 1832.
Montia linearis Greene, Fl. Fran. 181. 1891.
Montiastrum lineare Rydb. Fl. Rocky Mts. 265, 1061. 1917.

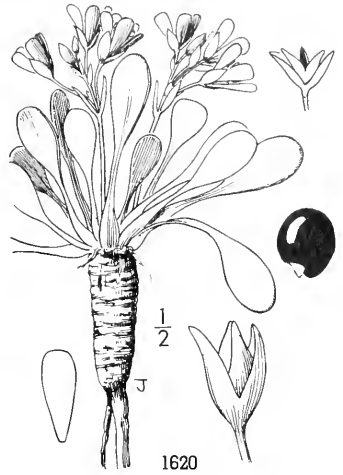
Erect much branched annual, 6–18 cm. high. Leaves alternate, linear, 1.5–3.5 cm. long, the petioles with enlarged scarious bases; inflorescence terminal, of loose-flowered racemes 2–5 cm. long, subtended by scarious, ovate-lanceolate bracts; flowers 2–7, nodding, pedicels 6–14 mm.



1618



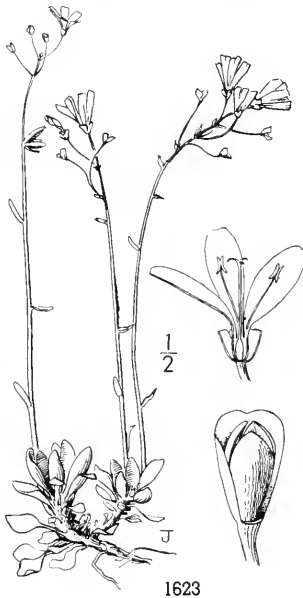
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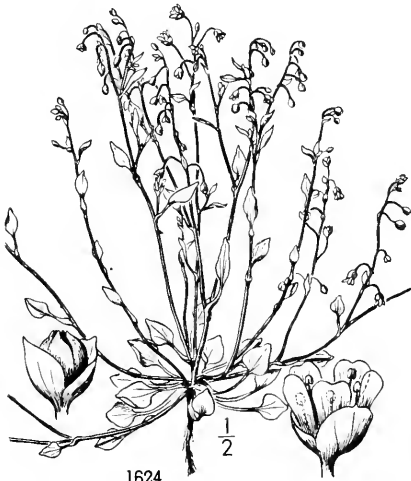
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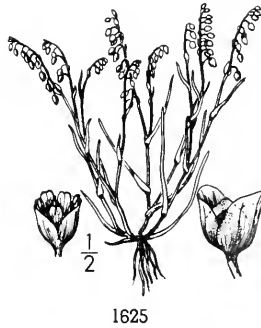
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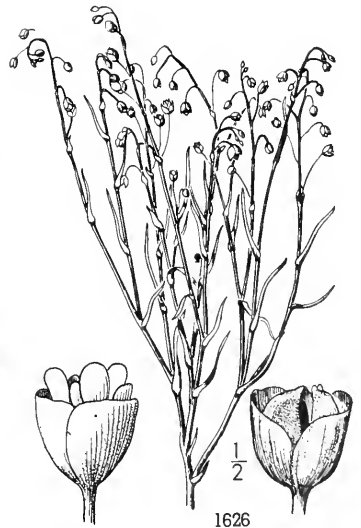
1623



1624



1625



1626

1618. *Claytonia umbellata*
1619. *Claytonia lanceolata*
1620. *Claytonia nivalis*

1621. *Claytonia bellidifolia*
1622. *Claytonia nevadensis*
1623. *Montia parvifolia*

1624. *Montia diffusa*
1625. *Montia dichotoma*
1626. *Montia linearis*

long; sepals slightly unequal, reniform-orbicular, 3.5–4 mm. long, thin, veiny, green with a white margin and turning yellow throughout in age; petals 5, 4–5 mm. long, rounded or retuse, clawed, unequal in width and length; stamens 3; capsule ovoid, narrowed at the base; seeds 3, 1.5–2 mm. long, black, shining, microscopically reticulate particularly on the margin.

Damp soil in meadows and on hillsides, Transition Zone; British Columbia south to Cuyamaca Mountains, southern California, and east to Montana and Nevada. Type locality: Great and Little Falls of the Columbia River, Washington. April–June.

5. *Montia Howéllii* S. Wats. Howell's Montia. Fig. 1627.

Montia Howéllii S. Wats. Proc. Amer. Acad. 18: 191. 1883.

Claytonia Howéllii Piper, Contr. U.S. Nat. Herb. 11: 251. 1906.

Montiastrum Howéllii Rydb. Fl. N. Amer. 21: 296. 1932.

Diffuse branching annual, 1–4.5 cm. high, with the lower part of the decumbent stems rooting at the nodes. Leaves alternate, narrowly linear-spatulate, 1–10 mm. long with a dilated hyaline clasping base; inflorescence shorter than the leaves, axillary, 3–8-flowered with a scarious bract opposite the subtending leaf; sepals round-ovate, 1.5–1.8 mm. long; petals minute, 2 or wanting, white; style shorter than the capsule; stamens 2–3; capsule obovate, 1 mm. high; seeds 2–3.

In moist meadows, Humid Transition Zone; British Columbia, western Washington, and Oregon, south to Humboldt County, California. Type locality: Sauvies Island in the Willamette River, Oregon. March–May.

6. *Montia fontana* L. Water-chickweed, Water Montia. Fig. 1628.

Montia fontana L. Sp. Pl. 87. 1753.

Montia minor C. C. Gmelin, Fl. Bad. 1: 301. 1805.

Montia Chamissonis var. *tenerrima* A. Gray, Proc. Amer. Acad. 8: 378. 1872.

Montia Hallii A. Gray, Proc. Amer. Acad. 22: 283. 1887.

Montia humilis Suksdorf, Werdenda 1: 10. 1923.

Low weak branching annual, aquatic or terrestrial, often rooting at the nodes. Leaves opposite, sessile, spatulate to lanceolate, 5–15 mm. long; inflorescence leafy, the flowers nodding, solitary or in terminal clusters; sepals 2 (rarely a third present), reniform, 1–1.2 mm. long; petals white, more or less united at the base, split on one side with 3–5 rounded lobes a little surpassing the calyx; stamens 3–5; ovules 3; capsule depressed-globose, slightly 3-lobed, 1–2 mm. high, the valves tardily involute; seeds black, closely muricate with acutish tubercles, not shining.

Floating in streams or in drying pools, finally terrestrial, Lower Sonoran to Transition Zones; Washington south to Lower California, Mexico, and east to the Atlantic seaboard. Also in Eurasia and South America. Type locality: European. March–July.

Montia dipétala Suksdorf, Werdenda 1: 9. 1923. (*Montia stenophylla* Rydb. N. Amer. Fl. 21: 315. 1932.) Most marked variant, with more narrowly lanceolate leaves than the species, and often with only 2 corolla lobes. Found in early drying pools, interior valleys from Washington to southern California.

Montia Funstonii Rydb. N. Amer. Fl. 21: 316. 1932. Differs from *M. fontana* in having low rounded instead of acutish tubercles on the seed. Known only from the type collection from Whitney Meadows, Sierra Nevada, California.

7. *Montia Chamissoi* (Ledeb.) Durand & Jackson. Toad-lily. Fig. 1629.

Claytonia Chamissoi Ledeb. ex Spreng. Syst. 1: 780. 1825.

Claytonia stolonifera C. A. Mey. Nouv. Mém. Soc. Nat. Mosc. 1: 139. 1829.

Claytonia Chamissonis Eschsch. ex Cham. Linnaea 6: 562. 1831.

Claytonia aquatica Nutt. in Torr. & Gray, Fl. N. Amer. 1: 201. 1838.

Montia Chamissoi Durand & Jackson, Ind. Kew. Suppl. 1: 282, as a synonym. 1903.

Crunocallis Chamissonis Rydb. Bull. Torrey Club. 33: 139. 1906.

Perennial with floating or creeping leafy stems rooting at the nodes and producing runners having globose cormlets at the apex of the stems. Leaves opposite, oblanceolate, 1.5–4 cm. long, petiolate or sessile; inflorescence racemose, axillary or terminal with 3–8 flowers, rarely bractless or with 1–2 bracts at the base of the raceme, the pedicels recurved in fruit; sepals orbicular to reniform, nearly equal, 1.5–2 mm. high, 2–2.5 mm. broad; petals white or pink, 5–9 mm. long, ovate with a short claw, stamens 3–5; ovules 3; capsule obovoid, 1–1.5 mm. long; seeds 1–3, black, muricate, the tubercles low and rounded.

Mud or sand in bogs and streams, Upper Transition to Canadian Zones; Alaska to southern California and east to Minnesota and New Mexico. Type locality: Aleutian Islands, Alaska. June–August.

8. *Montia cordifolia* (S. Wats.) Pax & K. Hoffm. Cordate-leaved Montia. Fig. 1630.

Claytonia cordifolia S. Wats. Proc. Amer. Acad. 17: 365. 1882.

Claytonia asarifolia A. Gray, Proc. Amer. Acad. 22: 280. 1887. Not Bong. 1832.

Limnia cordifolia Rydb. N. Amer. Fl. 21: 306. 1932.

Montia cordifolia Pax & K. Hoffm. in Engler & Prantl, Nat. Pflanzenf. ed. 2. 16c: 259. 1934.

Perennial 1–3 dm. high, from a creeping, usually fleshy, sometimes slender rootstock. Basal leaves several, 6–22 cm. long, petioles 4–18 cm. long, blades suborbicular to rounded ovate, not acute at the apex, more or less cordate at the base, 2–6 cm. broad, faintly veiny; stem leaves 2, sessile, 1.5–2.5 cm. long, similar to the basal leaves; raceme naked, lax, simple, 4–9-flowered, 6–10 cm. long in flower, lengthening to 10–20 cm. in age; pedicels 10–20 mm. long, spreading and somewhat recurved in fruit; sepals suborbicular, 3.5–4 mm. long; petals 5, white, obovate, retuse,

8.5–12 mm. long; capsule 4 mm. high, the fruiting sepals but little longer; seeds 3, 2 mm. long, black and shining.

Shaded streams and marshy areas, Transition and Canadian Zones; British Columbia to the mountains of southern Oregon and northern California, east to Montana and northern Utah. Type locality: Pend Oreille River, Idaho. May–Aug.

9. *Montia saxosa* Brandg. Brandegee's *Montia*. Fig. 1631.

Claytonia saxosa Brandg. Zoe 4: 150. 1893.

Montia saxosa Brandg. ex Robinson in Gray, Syn. Fl. N. Amer. 1¹: 274. 1897.

Limnia saxosa A. Heller, Muhlenbergia 6: 84. 1910.

Dense succulent annual with many stems, 1–2.5 cm. high. Basal leaves spatulate to obovate, obtuse or rounded at the apex, 0.5–2 cm. long, the petioles short; cauline leaves 2, opposite, sessile, ovate, obtuse, not connate, subtending the subumbellate 2–5-flowered inflorescence; sepals 4–4.5 mm. long, ovate, entire, rounded at the apex; petals 5, ovate, emarginate at the apex, 5–5.5 mm. long, pinkish; stamens 5, shorter than the petals; ovules 3–4; style equaling the stamens, 3-cleft at the apex; capsule globose, 2.5 mm. high; seeds 2–3, foveolate, dark, shining, 2 mm. long.

In rocky places, Transition to Canadian Zone; Lake County to Humboldt County, California. Type locality: Snow Mountain, California. March–May.

10. *Montia perfoliata* (Donn) Howell. Miner's Lettuce. Fig. 1632.

Claytonia perfoliata Donn, Hort. Cantab. 25. 1796.

Limnia perfoliata Haw. Syn. Pl. Succ. 11. 1812.

Montia perfoliata Howell, Erythra 1: 38. 1893.

Claytonia parviflora Dougl. ex Hook. Fl. Bor. Amer. 1: 225. 1832.

More or less fleshy, often reddish annual, erect or spreading, 5–30 cm. high. Basal leaves several, petioled, spatulate or lanceolate to rhomboidal, 1–7 cm. long; stem leaves 2, united in an orbicular or angled disk subtending the inflorescence; flowers pink or white, in congested or elongated often verticillate racemes with a bract at the first branch of the inflorescence; sepals rounded, ovate, 2–3 mm. long; petals 5, clawed, notched at the apex, 3–4.5 mm. long; ovules 3; capsule globose; seeds 3, black, shining, 1–2 mm. long, minutely granulate with low tubercles.

Common in more or less shady places, valleys and hills, Lower Sonoran and Transition Zones; British Columbia to Lower California and east to North Dakota and Arizona. Type locality: west coast of North America, Feb.–April. Variable as to shape of basal leaves and to size and color of the plants. For complete treatment of the segregates of the species see N. Amer. Fl. 21: 307–311. 1932.

Montia perfoliata var. *nubigena* (Greene) Jepson, Fl. W. Mid. Calif. 186. 1901. Glauous annual with petals 4–6 mm. long. Higher elevations of the coastal mountains of central California.

Montia perfoliata var. *depressa* (A. Gray) Jepson, Fl. Calif. 471. 1914. Low, spreading reddish plants with broadly rhomboidal basal leaves. Pine forests and chaparral, central California to Oregon.

Montia perfoliata subsp. *glauca* (Nutt.) Ferris. (*Claytonia parviflora* var. *glauca* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 200. 1830. *Montia pallida* M. E. Peck, Proc. Biol. Soc. Wash. 47: 185. 1934.) Low tufted glauous plant with narrowly spatulate basal leaves. Western Washington south through the Willamette Valley to the California border.

11. *Montia gypsophiloides* (Fisch. & Mey.) Howell. Coast Range *Montia*. Fig. 1633.

Claytonia gypsophiloides Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 33. 1836.

Montia gypsophiloides Howell, Erythra 1: 38. 1893.

Montia diaboli Rydb. N. Amer. Fl. 21: 312. 1932.

Glauous, sometimes pinkish-tinged annual with few to several erect or ascending slender stems, 6–20 cm. high. Basal leaves many, narrowly linear, 2.5–9 cm. long; stem leaves ovate to lanceolate, 8–12 mm. long, united on one side at the base, often to above the middle; inflorescence many-flowered, an open pedunculate slender raceme much surpassing the leaves, 5–12 cm. long, elongate in age; pedicels slender, 6–8 mm. long, the lowest one bracteate, reflexed in age; sepals 2–2.5 mm. long; petals 4, 5–7 mm. long, white or pinkish; capsule 2.5 mm. high; seeds 2–3, dark, shining, more or less minutely tuberculate.

Open slopes, Upper Sonoran and Transition Zones; northern California south to San Luis Obispo County, California. Type locality: Fort Ross, California. March–May.

12. *Montia spathulata* (Dougl.) Howell. Common *Montia*. Fig. 1634.

Claytonia spathulata Dougl. ex Hook. Fl. Bor. Amer. 1: 226. 1832.

Montia spathulata Howell, Erythra 1: 38. 1893.

Montia rosulata Eastw. Proc. Calif. Acad. III. 1: 79. 1897.

Dense, succulent tufted glauous annual 2–6 cm. high. Basal leaves many, narrowly linear to linear-spatulate, generally surpassing the stems; stem leaves ovate-acute to narrowly lanceolate or linear, connate at the base on one side, 1–2 cm. long; inflorescence 5–20 mm. long, short-pedunculate to subsessile, 3–6-flowered, the first branch of the raceme bracteate; sepals 1–1.3 mm. long, ovate-lanceolate; petals 5, white or pinkish, notched or rounded at the apex, 2.5–3 mm. long; mature capsule ovoid, 1.5–2 mm. high; seeds 3, about 0.5 mm. long, closely granulate with low tubercles.

Open, grassy or gravelly hill slopes, Upper and Lower Sonoran Zones; British Columbia to central California. Type locality: Canada. Feb.–May.

Montia spathulata var. *exigua* (Torr. & Gray) Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 275. 1897. Plant more robust, less tufted, petals 3.5–4 mm. long and seeds about 1 mm. long. Washington and eastern Nevada to southern California.



1627



1628



1629



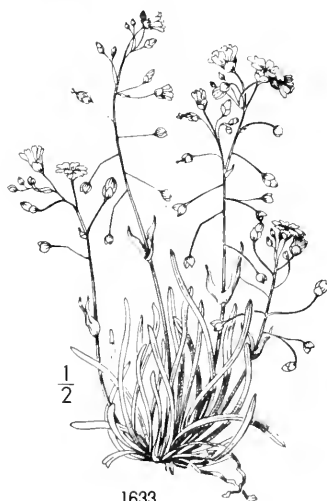
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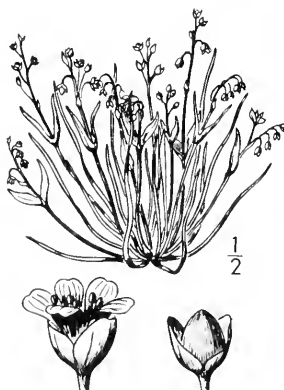
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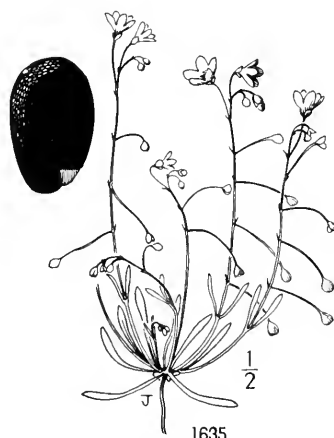
1632



1633



1634



1635

1627. *Montia Howellii*
 1628. *Montia fontana*
 1629. *Montia Chamissoi*

1630. *Montia cordifolia*
 1631. *Montia saxosa*
 1632. *Montia perfoliata*

1633. *Montia gypsophiloides*
 1634. *Montia spathulata*
 1635. *Montia arenicola*

Montia spatulata var. *tenuifolia* (Torr. & Gray) Munz, Man. S. Calif. 157. 1935. Somewhat glaucous annual with several to many slender stems and linear basal leaves typically shorter than the stems; stem leaves linear-lanceolate to linear-oblongate, connate only at the base, surpassing or equaling the subumbellate inflorescence; petals 3–4 mm. long. In shady places, Siskiyou County to San Diego County, California, but most abundant in foothills adjacent to San Joaquin Valley from Monterey and Tuolumne Counties south to San Diego County, California.

Montia spatulata var. *viridis* Davidson, Bull. S. Calif. Acad. 5: 61. 1907. Plant green, the narrow basal leaves with evident petioles and stem leaves surpassing the inflorescence; sepals markedly unequal. Mountains of southern California, Ventura County to San Diego County.

13. *Montia arenicola* (Henderson) Howell. Henderson's Montia. Fig. 1635.

Claytonia arenicola Henderson, Bull. Torrey Club 22: 49. 1895.

Montia arenicola Howell, Fl. N. W. Amer. 1: 96. 1897.

Limnia arenicola Rydb. Bull. Torrey Club 33: 138. 1906.

Glabrous annual 6–15 cm. high, with several slender stems arising from the base. Basal leaves linear to narrowly spatulate, about two-thirds the length of the stems; stem leaves distinct, opposite, linear to narrowly spatulate, 1–3 cm. long; inflorescence lax, 3–8 cm. long, pedicels slender, 7–18 mm. long, 3–14-flowered with a minute lanceolate bract subtending each pedicel; sepals 1.8–2 mm. long, broadly ovate, acute at the apex; petals pink or white with pink lines, 6–8 mm. long, emarginate; capsule shorter than the sepals; seeds 2–3, dark, shining, faintly granulate, ellipsoid, 1–1.3 mm. long.

Sandy banks and pine woods, Arid Transition Zone; eastern Washington and western Idaho south to Wallowa County, Oregon. Type locality: Washington and Idaho. March–April.

14. *Montia sibirica* (L.) Howell. Siberian Montia, Candy Flower. Fig. 1636.

Claytonia sibirica L. Sp. Pl. 204. 1753.

Claytonia asarifolia Bong. Mém. Acad. St.-Petersb. VI. 2: 137. 1832.

Claytonia alsinoides Sims, Bot. Mag. 32: 1309. 1810.

Claytonia bulbifera A. Gray, Proc. Amer. Acad. 12: 54. 1876.

Montia sibirica Howell, Erythra 1: 39. 1893.

Montia washingtoniana Suksdorf, Deutsch. Bot. Monatss. 16: 220. 1898.

Limnia bracteosa Rydb. N. Amer. Fl. 21: 305. 1932.

Rather succulent perennial (rarely annual), stems several, 1.5–4.5 dm. high with slender rootstock, the thickened leaf bases on the crown sometimes persisting as bulblet scales. Basal leaves several, 10–25 cm. long, blades 1.5–5.5 cm. long, broadly or narrowly ovate, truncate or attenuate at the base, acute at the apex; stem leaves opposite, sessile (rarely subsessile), 1.8–5 cm. long, broadly ovate, acute, subtending the branches of the inflorescence; racemes open, lax, 6–30 cm. long, 1–4 on each stem, 10–25-flowered, in vigorous plants the racemes branched with 2 (sometimes 1) small stem leaves subtending the branches; pedicels slender, 1–3.5 cm. long, divergent in age, each subtended by a green, linear-lanceolate to obovate bract 4–10 mm. long; sepals 3–6 mm. long, orbicular to ovate, somewhat enlarged in age; petals 7–10 mm. long, pink or white with pink lines, emarginate at the apex; capsule shorter than or equaling the calyx; mature seeds 1–3, dark, shining, finely granulate with low tubercles, 2–2.5 mm. long.

In bogs and moist woods, Transition and Canadian Zones; eastern Siberia to Alaska, south to Santa Cruz County, California, and east to Idaho and Montana. Type locality: Siberia. March–Sept.

15. *Montia heterophylla* (Nutt.) Jepson. Different-leaved Montia. Fig. 1637.

Claytonia unalaschkensis var. *heterophylla* Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 199, as a synonym. 1838.

Claytonia alsinoides var. *heterophylla* Torr. & Gray, Fl. N. Amer. 1: 199. 1838.

Montia sibirica var. *heterophylla* Robinson in A. Gray, Syn. Fl. N. Amer. 1: 273. 1897.

Montia heterophylla Jepson, Fl. Calif. 474. 1914.

Perennial from a rootstock, propagating by stolons producing tubers, 1 to several stems 12–30 cm. high. Basal leaves 9–20 cm. long, the blades 4–9 cm. long, attenuate at the base, broadly linear to narrowly linear-oblongate; stem leaves 2, distinctly petioled, 1.5–6 cm. long, narrowly oblongate, attenuate at the base, the blade much surpassing the petiole, rarely equaling it; racemes one or more to each stem, 10–15 cm. long; pedicels bracteate, slender, 1–3 cm. long, spreading in age; sepals round-ovate, sometimes subcordate at base, 3–4 mm. long; petals white with pink veins, emarginate, 5–7 mm. long; mature capsule shorter than the sepals; seeds 1–3, dark, shining.

In shady woods, Transition Zone; western Washington south to the Siskiyou Mountains, southern Oregon, and in the Sierra Nevada to Fresno County, California. Type locality: "Columbia woods," Oregon. March–May.

5. SPRÆGUEA Torr. Smiths. Contr. 6: 4. 1853.

Plant annual or perennial from a taproot. Leaves mostly basal, stem leaves reduced. Inflorescence of scorpioid spikes arranged in umbels, heads or panicles. Flowers perfect. Sepals 2, persistent, scarious. Petals 4, withering around the style. Stamens 3. Styles united, long-filiform. Stigmas 2. Capsule membranous, 1–8-seeded. Seeds round-reniform, shining, not strophiolate. [Name in honor of I. Sprague, American botanical illustrator.]

A genus of 2 species, natives of western North America. Type species, *Spraguea umbellata* Torr.

Capsule ovate, 2–10-seeded; sepals 4.5–8 mm. long.

Capsule orbicular, 1–2-seeded; sepals 2–2.5 mm. long.

1. *S. umbellata*.

2. *S. monosperma*.

1. *Spraguea umbellata* Torr. Pussy Paws. Fig. 1638.

- Spraguea umbellata* Torr. Smiths. Contr. 6: 4. pl. 1. 1853.
Spraguea paniculata Kell. Proc. Calif. Acad. 2: 187. 1863.
Spraguea umbellata var. *montana* Jones, Bull. Torrey Club 9: 31. 1882.
Calyptidium nudum Greene, Pittonia 1: 64. 1887.
Spraguea eximia Eastw. Bull. Torrey Club 30: 486. 1903.
Spraguea irregularis Rydb. N. Amer. Fl. 21: 318. 1932.
Spraguea Hallii Rydb. N. Amer. Fl. 21: 318. 1932.

Low glabrous annual or perennial herbs, 5–25 cm. high, with several spreading stems. Leaves spatulate, 1.5–7 cm. long, basal, flowering stems with reduced cauline leaves or sometimes naked; inflorescence umbellate-cymose, sometimes capitate in appearance; flowers pink or white, imbricate-crowded, scarious-bracted; sepals pink or white, orbicular-reniform, 4.5–8 mm. long, scarious except for the greenish center, accrescent; petals 4, 3–6 mm. long, oblong or ovate; stamens usually 3, usually exserted; pistil 5–6 mm. long, exserted; stigma 2-lobed; capsule ovate, 3–4 mm. high, 2–10-seeded.

In loose sandy or gravelly soil, in the mountains, Arid Transition to Hudsonian Zones; British Columbia to Lower California and east to the Rocky Mountains. Type locality: probably in Shasta County, California. June–Aug.

Spraguea umbellata var. *caudicifera* A. Gray, Syn. Fl. N. Amer. 1st: 278. 1897. A perennial with branching caudex, thick basal leaves, a short scape-like stem and a glomerate-capitate inflorescence. Alpine Zone; Washington to southern California and east to the Rocky Mountains.

2. *Spraguea monosperma* (Greene) Rydb. One-seeded Pussy Paws. Fig. 1639.

- Calyptidium monospermum* Greene, Erythea 3: 63. 1895.
Spraguea pulchella Eastw. Bull. Torrey Club 29: 79. 1902.
Spraguea monosperma Rydb. N. Amer. Fl. 21: 319. 1932.

Slender glabrous annual, 2–5 cm. high. Basal leaves spatulate, 1–2 cm. long, cauline leaves few, reduced; inflorescence of crowded scorpioid spikes arranged in a panicle; sepals scarious except for center, 2–2.5 mm. long, orbicular-reniform, emarginate, equal or nearly so; petals 4, equalling the sepals or nearly so; capsule orbicular, 1–2-seeded.

Exposed slopes, Canadian Zone; known only from Mariposa and Inyo Counties, California. Type locality: Big Cottonwood Meadows, Inyo County, California. June–Aug.

6. CALYPTRIDÍUM Nutt. in Torr. & Gray, Fl. N. Amer. 1: 198. 1838.

Low, somewhat succulent herbs with basal and alternate leaves. Flowers in scorpioid spikes or spike-like panicles. Petals 2–4, fragile, folding over the pistil after anthesis and carried up on the ripening capsule. Sepals 2, unequal, scarious or scarious-margined, plane, more or less accrescent, mostly broader than long. Stamens 1–3. Style simple, short, 0.5–2 mm. long; stigmas 2. Capsule 2-valved, 6–many-seeded. Seeds compressed, black. [Name Greek, a covering or calyptré.]

A genus of four or five species found only in western North America. Type species, *Calyptidium monandrum* Nutt.

Sepals not exceeding the mature capsule.

Capsule linear, one or two times longer than the sepals.

Capsule oblong, exceeding the sepals by one-half its length or less.

1. *C. monandrum*.

2. *C. Parryi*.

Sepals exceeding the mature capsule.

Petals 2; sepals herbaceous with a scarious margin.

Petals 4; sepals scarious throughout.

3. *C. roseum*.

4. *C. quadripetalum*.

1. *Calyptidium monandrum* Nutt. Common Calyptidium. Fig. 1640.

Calyptidium monandrum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 198. 1838.

Depressed or spreading annual with branches 2–15 cm. long. Leaves spatulate, 1.5–4 cm. long, mostly basal, a few scattered along the branches; inflorescence paniculate, the branchlets scorpioid when young, elongate and secund with age; sepals 0.5–2 mm. long, with a narrow scarious margin, slightly unequal, little accrescent; petals 3, occasionally 2, ovate; stamen 1; style very short; capsule linear, 5–6 mm. long, obscurely notched at the apex, usually curved, dehiscent; seeds 6–10.

In sandy or clay soils, Upper and Lower Sonoran Zones; Santa Clara County, California, south to Lower California, Mexico, and east to central Nevada, Arizona, and Sonora, Mexico. Type locality: San Diego, California. March–June.

2. *Calyptidium Parryi* A. Gray. Parry's Calyptidium. Fig. 1641.

Calyptidium Parryi A. Gray, Proc. Amer. Acad. 22: 285. 1887.

Calyptidium pygmaeum Parish ex Rydb. N. Amer. Fl. 21: 320. 1932.

Depressed or spreading annuals, with branches 2–10 cm. long. Leaves mostly basal, spatulate, 1–3 cm. long; inflorescence paniculate, with short, few-flowered scorpioid clusters, secund with age; sepals unequal, 2–3.5 mm. long, mostly oval, white, scarious-margined, somewhat accrescent; petals 3 or 4, shorter than the sepals; stamens 2 or rarely 3; style short, about one-half to one-third the length of the ovary; capsule oblong, minutely emarginate at the apex, 8–15-seeded.

In open places, Upper Sonoran and Transition Zones; Mount Hamilton Range and Mount Pinos region to the San Jacinto and San Bernardino Mountains, California, east to southwestern Arizona. Type locality: Bear Valley, San Bernardino Mountains, California. June–July.

3. *Calyptridium roseum* S. Wats. Rosy Calyptridium. Fig. 1642.

Calyptridium roseum S. Wats. Bot. King Expl. 44. 1871.

Depressed or spreading annuals with branches varying from 2 to 10 cm. in length. Leaves few, spatulate, 2–5 cm. long, basal and scattered along the branches; inflorescence paniculate, the branches with short, peduncled scorpioid clusters; sepals asymmetrical, somewhat accrescent, the larger 4 mm., the smaller 2 or 3 mm. long, orbicular with a broad scarious margin, white or tinged with pink; petals 2, small; stamen 1, not surpassing the petals; style 0.5 mm. long or less, 2-parted and with a subcapitate stigma; capsule ovate-oblong, shorter than the calyx, 6–15-seeded.

Alkaline valleys of the Great Basin region, Upper Sonoran Zone; eastern Oregon and Wyoming to Inyo County, California, and central Nevada. Type locality: Monitor Valley, Nevada. June–July.

4. *Calyptridium quadripetalum* S. Wats. Four-petaled Calyptridium. Fig. 1643.

Calyptridium quadripetalum S. Wats. Proc. Amer. Acad. 20: 356. 1885.

Calyptridium tetrapetalum Greene, Fl. Fran. 182. 1891.

Annual, erect or ascending from a decumbent base with branches 2–10 cm. long. Leaves basal and cauline, oblong, spatulate, 5–30 mm. long; inflorescence dense, 2–4 cm. long, scorpioid; sepals round-reniform, white or pink, scarious, 3–4 mm. long; petals 4, ovate, 2 mm. long; stamens 2–3, style very short; capsule oblong-oval, 10–20-seeded.

In open places, Upper Sonoran Zone; Inner Coast Ranges from Glenn County to Sonoma County, California. Type locality: Lake County, California. June.

7. *LEWISIA* Pursh, Fl. Amer. Sept. 368. 1814.

Glabrous perennial from a globose corm or fleshy root with a short caudex and stems jointed at the base or below the inflorescence. Basal leaves entire, enlarged at the base of the petiole, the widened base mostly hyaline. Stem leaves few, often bract-like. Inflorescence bracteate, 1–40-flowered, sometimes readily disjuncting in age. Flowers perfect, soon withering. Petals 4–18, often unequal in width and sometimes in length. Sepals 2–6, persistent. Stamens 5 to many with versatile anthers and slender filaments often united at the base. Styles 3–8, united at the base. Capsule globose or ovoid, in most cases thin-walled, circumscissile at the base, then splitting towards the apex. Seeds 6–70, rarely as few as 3, black or dark brown, shining, finely granulate with low tubercles to very smooth. [Name in honor of Meriwether Lewis of the Lewis and Clark Expedition.]

A genus of about 18 species, native of western North America. Type species, *Lewisia rediviva* Pursh.

Basal leaves absent or solitary.

1. *L. triphylla*.

Basal leaves present, many.

Petals 2.5 cm. or more long; seeds with a conspicuous aril.

2. *L. Tweedyi*.

Petals less than 2 cm. long; seeds without an aril.

Stems 11–35 cm. high, much exceeding the basal leaves.

Stem leaves similar to the basal; stamens many.

3. *L. oppositifolia*.

Stem leaves bract-like; stamens less than 10.

Flowers with stout pedicels; petals 10–17 mm. long.

4. *L. Cotyledon*.

Flowers with slender pedicels; petals 6–10 mm. long.

Basal leaves terete or nearly so; branches of the inflorescence divaricate.

5. *L. Leana*.

Basal leaves flattened; branches of the inflorescence ascending.

6. *L. columbiana*.

Stems short, scarcely if at all surpassing the leaves.

Bracts remote from the sepals and dissimilar to them.

Sepals herbaceous or scarious; inflorescence not disjuncting in fruit.

Sepals glandular-toothed, veins conspicuous in age.

7. *L. pygmaea*.

Sepals entire or if obscurely few-toothed then not glandular.

Petals white, 8–12 mm. long.

8. *L. nevadensis*.

Petals pink or red, 3–4 mm. long.

9. *L. sierrae*.

Sepals petaloid, becoming scarious throughout; inflorescence readily disjuncting in fruit.

Sepals 6; bracts 5–8, subulate.

10. *L. rediviva*.

Sepals 2; bracts 1–3, ovate.

11. *L. disepala*.

Bracts immediately below the sepals and similar to them.

Bracts entire.

12. *L. brachycalyx*.

Bracts glandular-denticulate.

13. *L. Kelloggii*.

1. *Lewisia triphylla* (S. Wats.) Robinson. Three-leaved *Lewisia*. Fig. 1644.

Claytonia triphylla S. Wats. Proc. Amer. Acad. 10: 345. 1875.

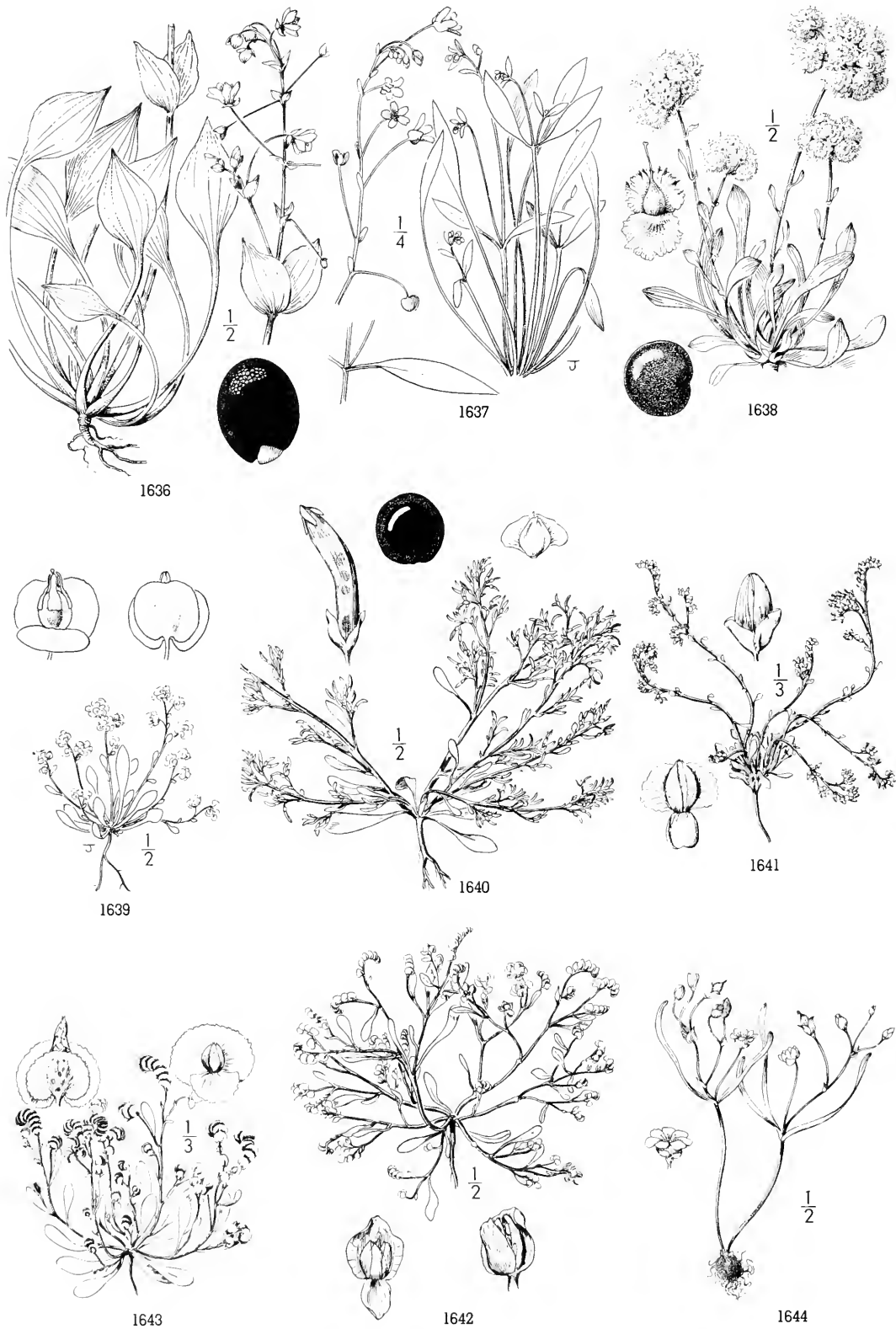
Oreobroma triphyllum Howell, Erythraea 1: 33. 1893.

Lewisia triphylla Robinson in A. Gray, Syn. Fl. N. Amer. 1^a: 269. 1897.

Eriocallis triphylla Rydb. Bull. Torrey Club 33: 140. 1906.

Perennial from a deep-seated corm with 1–5 slender stems 3–11 cm. high. Basal leaves none at flowering time; cauline leaves 2–4, linear, 2.5–5 cm. long, opposite or verticillate, subtending the inflorescence; inflorescence bracteate, umbellate, sometimes branching; flowers 3–15, rarely 1–2; sepals oval, entire, 3–4 mm. long; petals white or pink, 5–8, 4–5.5 mm. long; capsule membranous, ovate, 3–4 mm. high; seeds 10–25, dark, shining.

Common in sandy or gravelly soil, Transition and Canadian Zones; mountain ranges of Washington south to the southern Sierra Nevada, California, and east to the Rocky Mountains. Type locality: Cisco, California. June–Aug.



1636. *Montia sibirica*
1637. *Montia heterophylla*
1638. *Spraguea umbellata*

1639. *Spraguea monosperma*
1640. *Calyptridium monandrum*
1641. *Calyptridium Parryi*

1642. *Calyptridium roseum*
1643. *Calyptridium quadripetalum*
1644. *Lewisia triphylla*

2. *Lewisia Tweedyi* (A. Gray) Robinson. Tweedy's *Lewisia*. Fig. 1645.

Calandrinia Tweedyi A. Gray, Proc. Amer. Acad. 22: 277. 1887.

Oreobroma Tweedyi Howell, Erythraea 1: 33. 1893.

Lewisia Tweedyi Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 268. 1897.

Lewisia aurantiaca A. Nels. Univ. Wyo. Pub. Bot. 1: 63. 1924.

Glabrous perennial with fleshy, usually branching root and short, thick caudex. Leaves basal, obovate, entire, sometimes emarginate at apex, 7–15 cm. long, 2.5–3.5 cm. broad, the petiole about equaling the blade; flowering scapes several, equaling or surpassing the leaves, with broadly lanceolate scarious bracts below the inflorescence and subtending the branches; inflorescence racemose, 1–3-flowered; sepals 9–10 mm. long, rounded oval, scarious; petals 10–12, ovate, acute at base, white or yellow, 2.5–3 cm. long, stamens about 15, half the length of the petals, ovules 25–30; capsule ovate, 9 mm. long, firm-walled; seeds 12–20, granulate, dark, scarcely shining, with conspicuous scale-like aril.

Rocky slopes, Arid Transition Zone; Chelan County, Washington. Type locality: Wenatchee Mountains, Washington. May–July.

3. *Lewisia oppositifolia* (S. Wats.) Robinson. Opposite-leaved *Lewisia*. Fig. 1646.

Calandrinia oppositifolia S. Wats. Proc. Amer. Acad. 20: 355. 1885.

Oreobroma oppositifolium Howell, Erythraea 1: 32. 1893.

Lewisia oppositifolia Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 268. 1897.

Cauliscent perennial 10–17 cm. high with a thickened, often branching root and short caudex. Basal leaves few, linear-spatulate, 5–10 cm. long; stem leaves similar, 1–2 pairs near the base of the stem; stems 1–4 from each root; inflorescence subumbellate, 2–6-flowered, the subtending bracts entire or sometimes erose at the apex; pedicels 2.5–5 cm. long; sepals orbicular, 5–8 mm. long, irregularly fimbriate-dentate, glandless, not conspicuously veiny in age; petals white or pinkish, 9–12 mm. long; stamens many; stigmas deeply cleft; ovules 18–25; capsule ovoid, 5 mm. high; seeds 6–15, dark, shining.

Rocky ground, Transition Zone; Josephine County, Oregon, to Del Norte County, California. Type locality: Waldo, Oregon. March–May.

4. *Lewisia Cotyledon* (S. Wats.) Robinson. Siskiyou *Lewisia*. Fig. 1647.

Calandrinia Cotyledon S. Wats. Proc. Amer. Acad. 20: 255. 1885.

Oreobroma Cotyledon Howell, Erythraea 1: 32. 1893.

Lewisia Cotyledon Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 268. 1897.

Lewisia Finckae Purdy, Leaflets West. Bot. 1: 20. 1932.

Perennial with thickened roots and heavy caudex 1–2 cm. thick. Leaves basal, many, 3.5–11 cm. long, spatulate, margins entire to undulate, sometimes apiculate at the apex, but little crisped, petiole broadened at the base; stems several, 6–30 cm. high with 2–4 alternate or opposite toothed bracts below the inflorescence; inflorescence short-paniculate, branches subtended by toothed glandular bracts; flowers many, short-petioled; sepals 5–6 mm. long, 3.5–6 mm. broad, many-nerved, obtuse to truncate, each nerve ending with a dark gland-tipped tooth; petals 8–10, white tinged with rose or salmon turning rose with age, obovate to spatulate, 12–15 mm. long; stamens 5–8, shorter than the petals, slightly united at the base; ovules 13–20; capsule ovoid, 5–6 mm. high; seeds 8–15, dark, shining.

Rocky soil or in rock crevices, Transition and Canadian Zones; mountains of southwestern Oregon and northwestern California. Type locality: headwaters of the Illinois River, California. April–May.

Lewisia Cotyledon var. *Howellii* (S. Wats.) Jepson, Fl. Calif. 479. 1914. (*Oreobroma Heckneri* Morton.) Leaf margins conspicuously crisped or fimbriate-toothed and panicles 6–12-flowered. Josephine County, Oregon, south to Trinity County, California.

5. *Lewisia Leana* (Porter) Robinson. Lee's *Lewisia*. Fig. 1648.

Calandrinia Leana Porter, Bot. Gaz. 1: 49. 1876.

Oreobroma Leanum Howell, Erythraea 1: 31. 1893.

Lewisia Leana Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 267. 1897.

Perennial with branching roots and thick, fleshy caudex. Leaves many, fleshy, terete or nearly so, acute, 1.5–3 cm. long; stems 1–4, 11–18 cm. long, jointed at the base, occasionally with lacinate glandular-toothed bracts below the panicle; divaricate branches of the inflorescence bracteate; flowers many; petals 5–6.5 mm. long, obovate, magenta or white streaked with red; sepals 1.5–2 mm. long, truncate, lacrose-dentate, the teeth with dark glands; stamens 4–8, about the length of the petals; ovules 5–6, sometimes 3; capsule thin, ovate, 4–5 mm. long; seeds 3, rarely more, 2–2.5 mm. long, dark brown, shining.

On rocks, Boreal Zone; mountains of southwestern Oregon and northwestern California. Type locality: Siskiyou Mountains. June–Aug.

6. *Lewisia columbiana* (Howell) Robinson. Columbia *Lewisia*. Fig. 1649.

Calandrinia columbiana Howell in A. Gray, Proc. Amer. Acad. 22: 277. 1887.

Oreobroma columbianum Howell, Erythraea 1: 32. 1893.

Lewisia columbiana Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 269. 1897.

Lewisia Eastwoodiana Purdy, Leaflets West. Bot. 1: 20. 1932.

Perennial with thick root and short caudex. Basal leaves fleshy, 3–8 cm. long, flat, narrowly oblanceolate; stem leaves few, bracteate; stems several, 12–30 cm. high; inflorescence loosely

paniculate, several- to many-flowered, the branches with gland-toothed bracts; flowers bright pink or white with pink lines, the pedicels slender; sepals broadly rounded, with prominent veins, margin erose-dentate with dark glands; petals 7–10, 6–10 mm. long; stamens 5–6, shorter than the petals; ovules 5–7, sometimes 3; capsule ovate, but little surpassing the sepals; seeds black, shining, 1.5–2 mm. long.

Rocky slopes, Transition and Canadian Zones; Cascade Mountains of British Columbia and Washington, south to the mountains of northwestern California and to Fresno County in the Sierra Nevada, California. May–July.

Lewisia columbiana subsp. *Congdonii* (Rydb.) Ferris. (*Oreobroma Congdoni* Rydb. N. Amer. Fl. 21: 322. 1932.) Widely branching few-flowered panicles and long-petioled leaves, 6–15 cm. long. Mariposa County, California.

Lewisia columbiana subsp. *rupicola* (English) Ferris. (*Lewisia rupicola* English, Proc. Biol. Soc. Wash. 47: 190. 1934.) Panicles short, few-flowered; petals magenta, 12–13 mm. long. Saddle Mountain, Clatsop County, Oregon, and Chehalis County, Washington.

7. *Lewisia pygmaea* (A. Gray) Robinson. Alpine or Dwarf *Lewisia*. Fig. 1650.

Talinum pygmaeum A. Gray, Amer. Journ. Sci. II, 33: 407. 1862.

Calandrinia Grayi Britt. Bull. Torrey Club 17: 312. 1890.

Lewisia pygmaea Robinson in A. Gray, Syn. Fl. N. Amer. 1^a: 268. 1897.

Lewisia exarticulata St. John, Research Stud. St. Coll. Wash. 1: 59. 1929.

Perennial with a rarely branched fusiform root bearing several stems. Basal leaves several, linear, obtuse to acute, with widened hyaline bases, 1.5–3 mm. wide, 3–6 cm. long; stems usually reflexed in age; 1.5–5 cm. long, with opposite lanceolate bracts above the middle, flowers 1–3; sepals truncate or rounded, sometimes apiculate, 4–5 mm. long, erose, sometimes repand-dentate, glandular at the apex of the teeth, the glands scarcely darkened, strongly veined, somewhat accrescent with age; petals 5–8, white or rose pink, variable in length and width, 6–10 mm. long; ovules 25–35; stamens 5–8; capsule 4–6 mm. long; seeds 18–20, dark, shining.

Rocky slopes, Hudsonian and Arctic-Alpine Zones; Cascade Mountains, Washington, to Mount Whitney, Sierra Nevada, California, and east to Montana and New Mexico. Type locality: Rocky Mountains, Colorado. July–August.

Lewisia pygmaea var. *aridörum* Bartlett, Bot. Gaz. 44: 303. 1907. Root fusiform; stems few; sepals with dark glands and petals glandular-dentate at the apex, white, often rose pink. Mount Adams, Washington.

Lewisia pygmaea subsp. *glandulosa* (Rydb.) Ferris. (*Oreobroma glandulosum* Rydb. N. Amer. Fl. 21: 325. 1932.) Taproot thick; caudex short, 2–3 cm. broad; stems many; sepals sharply dentate with conspicuous dark glands on the marginal teeth; petals white or white with pink lines, 6–9 mm. long. Arctic-Alpine Zone, Sierra Nevada from Tuolumne County to Tulare County, California.

Lewisia pygmaea subsp. *longipétala* (Piper) Ferris. (*Oreobroma longipetalum* Piper, Contr. U.S. Nat. Herb. 16: 207. 1913.) Taproot thick, caudex short; stems many; sepals with conspicuous dark glands; petals rose red, 11–18 mm. long with scattered dark glandular teeth on the margin. Sierra Nevada, vicinity of Truckee, California.

8. *Lewisia nevadensis* (A. Gray) Robinson. Nevada *Lewisia*. Fig. 1651.

Calandrinia nevadensis A. Gray, Proc. Amer. Acad. 8: 623. 1873.

Claytonia Grayiana Kuntze, Rev. Gen. Pl. 57. 1891.

Lewisia nevadensis Robinson in A. Gray, Syn. Fl. N. Amer. 1^a: 268. 1897.

Lewisia bernardina Davidson, Bull. S. Calif. Acad. 20: 51. 1921.

Perennial with a conical or globose often branched fleshy root, 1 cm. thick and 1–2.5 cm. long. Leaves 5–15, linear to linear-lanceolate, 3–9 cm. long; stems several, partly subterranean, shorter than the leaves and usually recurved in fruit, with 2 lanceolate hyaline bracts 6–18 mm. long below the middle; flowers 1 or rarely 2; sepals broadly ovate, abruptly acute, 5–10 mm. long, entire or often inconspicuously repand-dentate, the veins not prominent in age; petals white, 6–10, variable in length and width in the same flower, 9–15 mm. long; stamens 6–12; stigmas 3–6; ovules 40–60; capsule ovoid, thin-walled, 5–10 mm. long; seeds many, black and shining.

Wet gravelly places or meadows, Transition to Canadian Zones and rarely in Hudsonian Zone; Washington south through the mountains of Oregon to the Sierra Nevada and the San Bernardino Mountains, California, east to Montana and Nevada. Type locality: East Humboldt Mountains, Nevada. June–August.

Lewisia minima A. Nels. in Coulter & Nels. Man. Bot. Rocky Mts. 179. 1909. A closely related form having smaller flowers and the acute sepals often irregularly repand-dentate, found in the Wallowa Mountains, Oregon.

9. *Lewisia sierrae* Ferris. Sierra *Lewisia*. Fig. 1652.

Perennial with a fleshy fusiform root and short caudex. Leaves several, basal, spreading or reflexed, 2.5–3.5 cm. long, the scarious winged petioles wider than the dark green linear blades; stems 13–25 mm. high, often sharply reflexed, usually reddish tinged, about as many as the leaves; inflorescence 1–3-flowered, the subtending cauline leaves 3, sometimes 2, bract-like, lanceolate, scarious, reddish tinged; pedicels 1.5–7 mm. long; bracts more or less broadly ovate, acute, longer than wide, the margin entire or obscurely repand or repand-dentate, not prominently veiny with age; petals 6, pink or rose, 3.5–4.8 mm. long, broadly or narrowly obovate and variable in length in the same flower; stamens 5–7, shorter than the petals; ovary 1.5–1.6 mm. long, stigma lobes 3, one-third the length of the style; ovules 22–25; capsule ovate, 2.5–3 mm. high; seeds 18–20, shining, faintly rugulose, 0.5 mm. broad.

Radix fusiformis; folia linearia; inflorescentia 1–3-flora; bracteae et sepala integra vel repanda non glanduloso-dentata; petala rosea; semina 18–20.

In sand or gravel above timber line, Arctic-Alpine Zone; Sierra Nevada from Tuolumne County to Tulare County, California. Type collected at Martha Lake, headwaters of South Fork of the San Joaquin River, alt. 10,900 feet, Fresno County, California, Ferris & Lorraine 9165 (no. 234110 Dudley Herbarium). July–August.

10. *Lewisia rediviva* Pursh. Bitterroot. Fig. 1653.*Lewisia rediviva* Pursh, Fl. Amer. Sept. 358. 1814.*Lewisia alba* Kell. Proc. Calif. Acad. 2: 115. 1861.*Lewisia minor* Rydb. N. Amer. Fl. 21: 327. 1932.

Perennial with stout branching root and short caudex, 1–3 cm. broad. Leaves basal, 2–5 cm. long, obtuse, broadly linear or narrowly clavate, very fleshy with a widened hyaline base; stems 1–3 cm. high, 1-flowered with 5–8-whorled, subulate, scarious bracts at the base of the pedicel, the flower and pedicel readily disjuncting in age; sepals 4–8, oval, imbricated, rose-colored or white, 1.5–2.5 cm. long; petals 12–18, rose-colored, sometimes white, 2–2.5 cm. long; stamens 35–50; ovules 25–40; capsule 5–6 mm. high; seeds 9–25, 2 mm. long, dark, shining.

Rocky soil or rock crevices, Arid Transition Zone; British Columbia to southern California, east to Montana, Colorado, and Arizona. Type locality: Bitterroot River, Montana. March–June.

11. *Lewisia disépala* Rydb. Two-Sepaled *Lewisia*, Yosemite Bitterroot. Fig. 1654.*Lewisia rediviva* var. *yosemitana* K. Brandg. Proc. Calif. Acad. II. 4: 89. 1894. Not *L. yosemitana* Jepson.*Lewisia discpala* Rydb. N. Amer. Fl. 21: 328. 1932.

Perennial with branching fleshy root and short caudex 5–8 mm. in diameter. Leaves fleshy, linear to clavate, obtuse, 8–20 mm. long; stems shorter than the leaves, 1-flowered with 2–3 ovate scarious bracts, 2–3 mm. long; pedicels 1–2 mm. long, jointed above the bracts and readily disjuncting; sepals entire, ovate, rounded, sometimes emarginate at the apex, 7–8 mm. long; petals 5–7, white or pinkish, variable in length and width, 13–18 mm. long; stamens about 15, shorter than the petals; ovules many; capsule ellipsoid; seeds 11–15, not strongly compressed, 1.5 mm. long.

Rocky soil, Hudsonian Zone; summits around Yosemite Valley, Sierra Nevada. Type locality: summits around Yosemite Valley, California. June–July.

12. *Lewisia brachycàlyx* Engelm. Southern *Lewisia*. Fig. 1655.*Lewisia brachycalyx* Engelm. ex A. Gray, Proc. Amer. Acad. 7: 400. 1868.*Lewisia brachycarpa* S. Wats. Bot. Calif. 1: 79. 1880.*Oreobroma brachycalyx* Howell, Erythea 1: 31. 1893.

Perennial with large branching root and short thickened caudex. Leaves many, 3–6 cm. long, broadly oblanceolate, longer than the inflorescence; stems many, 2–5 cm. long, floral bracts resembling sepals and closely subtending them, the flowers therefore sessile or nearly so; sepals ovate, acute, entire, 6–8 mm. long; petals 5–9, white, 12–18 mm. long; stamens 12–15; capsule ovate, 8–9 mm. high, seeds 40 or more, black and shining.

Marshy places, Transition Zone; Utah to Arizona and New Mexico and the San Bernardino and Cuyamaca Mountains, southern California. Type locality: western New Mexico. May–June.

13. *Lewisia Kellóggii* K. Brandg. Kellogg's *Lewisia*. Fig. 1656.*Lewisia Kelloggii* K. Brandg. Proc. Calif. Acad. II. 4: 88. 1894.*Oreobroma Kelloggii* Rydb. N. Amer. Fl. 21: 326. 1932.*Lewisia yosemitana* Jepson, Man. Fl. Pl. Calif. 352. 1923. Not *L. rediviva* var. *yosemitana* K. Brandg.

Fleshy perennial with stout root and short caudex. Leaves many, basal, spatulate, 1–4 cm. long, noticeably transverse wrinkled on drying; petiole widened, thick; stems jointed at the base, not readily disjuncting, 1-flowered, 1–5 cm. high, usually shorter than the leaves, bracts immediately below the sepals and similar to them; sepals ovate-lanceolate, acute at the apex, glandular-denticulate on the margin, the glands often dark; petals 7–11, white, 8–15 mm. long; stamens 15–20; ovules 12–18; capsule ovoid, thin-walled; seeds 12–15.

Sandy or gravelly soil, Canadian and Hudsonian Zones; Sierra Nevada from Plumas County to Mariposa County, California. Type locality: Cisco, California. June–July.

8. PORTULÁÇA [Tourn.] L. Sp. Pl. 445. 1753.

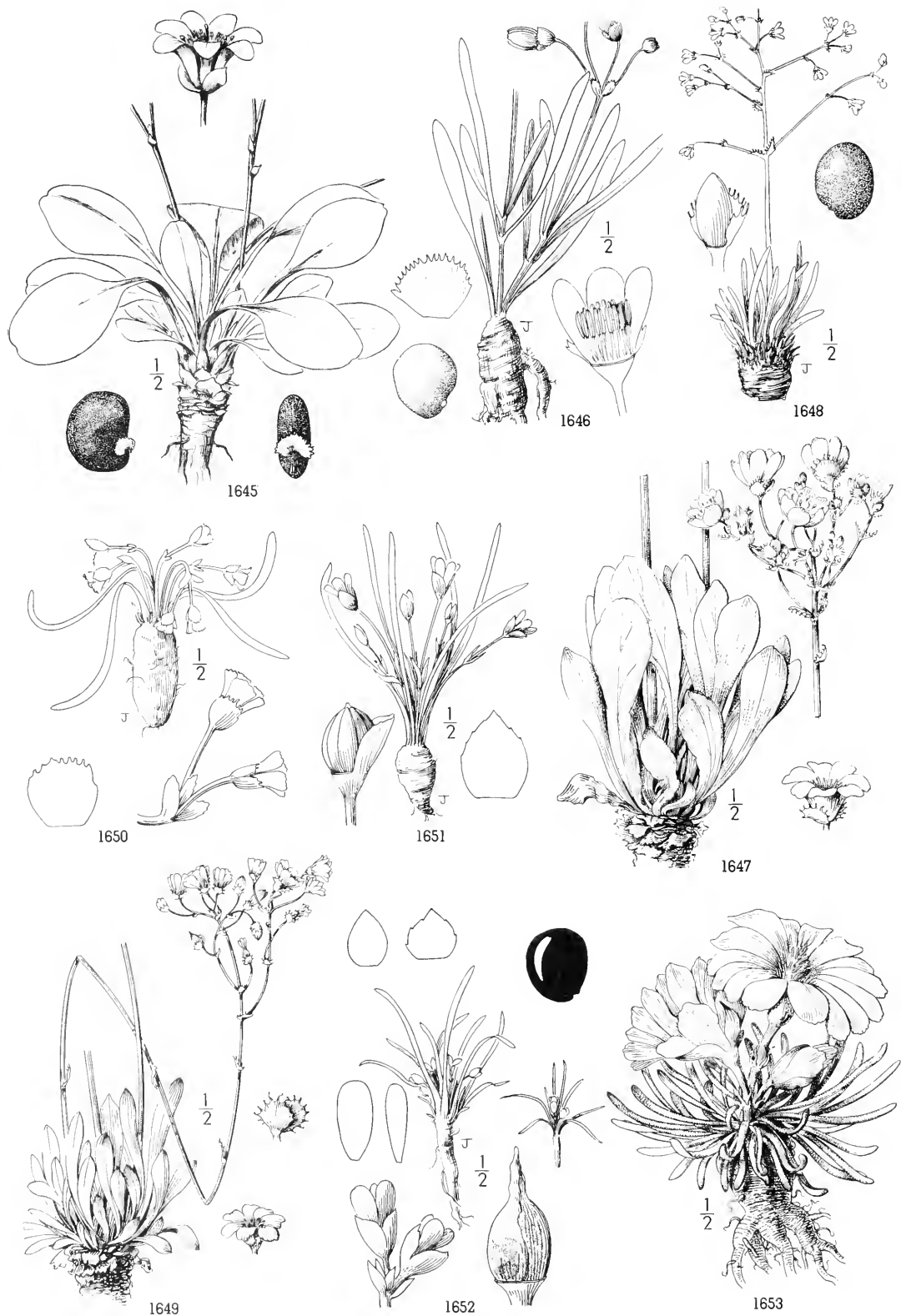
Low succulent herbs with alternate or partly opposite leaves and terminal sessile flowers. Sepals 2, united below and partly adnate to the ovary. Petals 4–6, inserted on the calyx, 7 to many. Style deeply 3–9-cleft or -parted. Capsule membranaceous to coriaceous, many-seeded, circumscissile near the middle. [Latin, in allusion to the purging qualities of some species.]

A genus of about 100 species of the tropical and subtropical regions of both hemispheres. Type species, *Portulaca oleracea* L.

1. *Portulaca oleràcea* L. Purslane. Fig. 1657.*Portulaca oleracea* L. Sp. Pl. 445. 1753.

Fleshy, prostrate, glabrous annuals with branches 9–20 cm. long. Leaves alternate, cuneate or obovate, 5–25 mm. long, clustered at the ends of the branches; flowers sessile, 2–6 mm. broad; sepals keeled, acute; petals emarginate, yellow, opening only in the sunshine; style 4–6-parted; capsule 4–8 mm. long; seeds black, finely rugose, about 0.5 mm. long.

In cultivated fields and waste places throughout Washington, Oregon, and California; naturalized from Europe. Type locality: Europe. May–Oct.



1645. *Lewisia Tweedyi*
1646. *Lewisia oppositifolia*
1647. *Lewisia Cotyledon*

1648. *Lewisia Leana*
1649. *Lewisia columbiana*
1650. *Lewisia pygmaea*

1651. *Lewisia nevadensis*
1652. *Lewisia sierrae*
1653. *Lewisia rediviva*

Family 43. **CARYOPHYLLACEAE.**

CHICKWEED FAMILY.

Annual or perennial herbs, rarely woody at base, with nodose stems and opposite, entire leaves. Flowers regular, perfect or rarely unisexual. Sepals 4 or 5, distinct or united into a tube. Petals as many as sepals, or rarely fewer or none, often toothed or lobed. Stamens alternating with the petals and usually of the same number, their filaments sometimes cohering at the base. Styles 2-5, distinct or united below; ovary free from the calyx, 1-celled or incompletely 2-5-celled at the base; placentae axial; ovules usually numerous. Fruit a many-seeded capsule, opening by 2-5 entire or bifid valves. Seeds small; embryo straight or curved; endosperm present.

A family of about 55 genera and 1,300 species, most abundant in the temperate regions.

Calyx with sepals distinct, or united only at the base.

Stipules wanting. (*Alsineae*)

Plants not fleshy; disk of the flower wanting or inconspicuous.

Petals 2-cleft or -parted, rarely none.

Capsule ovoid or oblong, dehiscent nearly or quite to the base by valves.

Capsule cylindric, often curved, dehiscent by short apical teeth.

Petals entire or merely emarginate, rarely none.

Capsule cylindric.

Capsule ovoid or oblong.

Styles as many as the sepals and alternate with them.

Styles fewer than the sepals.

Seeds not strophiolate.

Seeds strophiolate.

Plants fleshy, maritime; disk conspicuous, 8-10-lobed.

Stipules present, scarious.

Styles distinct to the base. (*Sperguleae*)

Styles and capsule valves 5.

Styles and capsule valves 3.

Styles united below, or sometimes wanting. (*Polycarpeae*)

Leaves flat, oblong or obovate.

Leaves subulate or setaceous.

Calyx with a well-marked tube, 5-toothed or -cleft; fruit a several- to many-seeded capsule. (*Sileneae*)

Styles more than 2.

Styles 5, alternate with the foliaceous calyx-teeth.

Styles 3-5, when 5 opposite the short calyx-teeth.

Capsule dehiscent by 6, rarely 3, apical teeth; styles 3, rarely 4 or 5.

Capsule dehiscent by 10 or sometimes 5 apical teeth; styles 5.

Styles 2.

Flowers showy, with well-developed blades.

Petals unappendaged.

Calyx strongly 5-angled, not bracteolate.

Calyx cylindric or nearly so, subtended by bractlets.

Petals with scale-like appendages at the base of the blades.

Flowers small, with minute blades; calyx-tube and capsule narrowly cylindric.

1. *Stellaria*.

2. *Cerastium*.

3. *Holosteum*.

4. *Sagina*.

5. *Arenaria*.

6. *Moeckringia*.

7. *Honckcnya*.

8. *Spergula*.

9. *Spergularia*.

10. *Polycarpon*.

11. *Loeflingia*.

12. *Agrostemma*.

13. *Silene*.

14. *Lychnis*.

15. *Vaccaria*.

16. *Dianthus*.

17. *Saponaria*.

18. *Velezia*.

1. **STELLARIA** L. Sp. Pl. 421. 1753.

Low, often diffusely branching annuals or perennials with cymose, white flowers. Sepals usually 5. Petals of the same number as the sepals or rarely none, 2-cleft or -parted. Stamens 10 or less, hypogynous. Ovary 1-celled, many-ovuled. Styles 3, or rarely 4 or 5, usually opposite the sepals. Capsule globose to oblong, dehiscent by twice as many valves as styles. Seeds smooth or roughened. [Name Latin, meaning star, in reference to the star-shaped flower.]

A genus of about 100 species of wide distribution. Type species, *Stellaria Holostea* L.

Annuals; lowest leaves petioled.

Leaves ovate.

Stems pubescent with a longitudinal line of hairs; leaves glabrous.

Stems and leaves pubescent throughout.

Leaves, at least the upper, linear-lanceolate; stems glabrous except at base, filiform.

Perennials; leaves all sessile or subpetiolate in nos. 8 and 9.

Petals deeply 2-parted; plants not glandular.

Bracts small and scarious.

Petals minute or absent; flowers umbellate.

Petals longer than the sepals; flowers cymose.

Pedicels spreading or deflexed; cymes diffuse.

Seeds smooth; leaves linear.

Seeds rough; leaves lanceolate.

Pedicels erect; cymes few-flowered; seed smooth.

1. *S. media*.

9. *S. washingtoniana*.

2. *S. nitens*.

3. *S. umbellata*.

4. *S. longifolia*.

5. *S. graminea*.

6. *S. longipes*.

Bracts foliaceous.

Petals minute or absent; leaves lanceolate.

Sepals acute, with scarious margins.

Leaves lanceolate to ovate-lanceolate; flowers axillary or cymose. 7. *S. borealis*.

Leaves ovate; flowers axillary.

Plants glabrous.

Plants finely puberulent.

Sepals obtuse, the margins not scarious; leaves ovate.

Petals equaling the sepals or nearly so.

Petals merely retuse or bifid at the apex; plants glandular.

8. *S. crispa*.

9. *S. washingtoniana*.

10. *S. obtusa*.

11. *S. littoralis*.

12. *S. Jamesiana*.

1. *Stellaria media* (L.) Cyrill. Common Chickweed. Fig. 1658.

Alsine media L. Sp. Pl. 272. 1753.

Stellaria media Cyrill. Char. Comm. 36. 1784.

Annual, glabrous throughout except for a longitudinal line of hairs along the stems, branches and pedicels; stems weak and decumbent or ascending, 10–40 cm. long. Leaves ovate or oval, 1–3 cm. long, the upper sessile, the lower petioled; flowers in terminal leafy cymes or axillary; pedicels slender; sepals 4–6 mm. long, oblong, acute; petals shorter than the sepals, 2-parted; capsule ovoid, longer than the sepals; seeds roughened.

A cosmopolitan weed, very common in the Pacific States. Native of Eurasia. March–Sept.

Stellaria humifusa Rothb. Skrift. Vid. Selsk. 10: 447. 1770. Glabrous annuals, with branched stems spreading or ascending, 3–10 dm. long. Leaves ovate to oblong, 4–6 mm. long, sessile, acute or obtuse; bracts similar to the leaves; flowers solitary or few; sepals ovate-lanceolate, 4 mm. long; petals equaling or slightly exceeding the sepals, 2-parted; capsule ovoid, equaling the sepals; seeds smooth, brown. A northern species ranging from Alaska to Labrador and New Brunswick, also Europe and Asia. Collected many years ago at Westport, Chehalis County, Washington (Leaflets West. Bot. 1: 199. 1936), but not since found in the Pacific States.

2. *Stellaria nitens* Nutt. Shiny Chickweed. Fig. 1659.

Stellaria nitens Nutt. in Torr. & Gray, Fl. N. Amer. 1: 185. 1838.

Alsine nitens Greene, Man. Bay Reg. 33. 1894.

Annual, the stems filiform, erect, several times forked, pubescent below. Leaves mostly basal, the lowest petioled, ovate, acute, about 4 mm. long, the upper sessile, linear-lanceolate, 6–10 mm. long; flowers few; sepals 3 mm. long, very acute, scarious-margined, 1–3-nerved; petals half as long as the sepals or sometimes wanting; capsule oblong, about as long as the sepals; seeds obscurely reticulate-roughened.

Grassy hillsides and valleys, Transition and Upper Sonoran Zones; British Columbia to northern Lower California and east to Utah. Type locality: "Plains of the Oregon." March–June.

3. *Stellaria umbellata* Turcz. Umbellate Chickweed. Fig. 1660.

Stellaria umbellata Turcz. Bull. Soc. Nat. Mosc. 15: 173. 1842.

Alsine baicalensis Coville, Contr. U.S. Nat. Herb. 4: 70. 1893.

Perennial, glabrous throughout except for cilia on the margins of the leaf bases; stems very slender, numerous and usually branching, 1–4 dm. long. Leaves oblong-lanceolate, narrowed to both ends, 1–2 cm. long, thin, much shorter than the internodes; flowers in the upper axils and in terminal umbellate cymes with small scarious bracts; pedicels very slender, usually recurved at the tip; sepals 2–5 mm. long, scarious-margined; petals minute, often none; capsule oblong-ovoid, the teeth obtuse, 4–5 mm. long; seeds light brown, very obscurely reticulate.

Moist soils usually in shade, Boreal Zones; Blue Mountains, Oregon, to the southern Sierra Nevada, California, Colorado, and northern Arizona; also Asia. Type locality: Siberia. July–Aug.

4. *Stellaria longifolia* Muhl. Long-leaved Starwort. Fig. 1661.

Stellaria longifolia Muhl. ex Willd. Enum. Hort. Ber. 479. 1809.

Stellaria Friesiana Ser. in DC. Prod. 1: 397. 1824.

Alsine longifolia Britt. Mem. Torrey Club 5: 150. 1894.

Perennial, glabrous throughout or with cilia at the base of the leaves, the stems erect or nearly so, 3–4 dm. high. Leaves linear, acute at each end, 2–3 cm. long; cyme many-flowered, open, long-peduncled and becoming lateral; pedicels spreading or at length reflexed; bracts scarious; sepals lanceolate, acute; petals exceeding the sepals; capsule straw-colored, exceeding the calyx; seed smooth.

In wet meadows, Humid Transition Zone; Alaska to western Oregon, east to Newfoundland and Kentucky. Type locality: Pennsylvania. May–July.

5. *Stellaria graminea* L. Lesser Starwort. Fig. 1662.

Stellaria graminea L. Sp. Pl. 422. 1753.

Alsine graminea Britt. Mem. Torrey Club 5: 150. 1894.

Perennial from creeping rootstocks, glabrous throughout, the stems weak, ascending, 2–5 dm. long. Leaves sessile, lanceolate or oblong-lanceolate, broadest just above the ciliolate base, 2–3 cm. long, 2–6 mm. wide, the lower smaller; cymes diffuse; pedicels spreading, slender; bracts scarious, 2–6 mm. long; sepals lanceolate, acute, 4–5 mm. long, 3-nerved; petals about the length of the sepals, 2-cleft; capsule oblong-ovoid, longer than the sepals; seeds finely roughened.

In wet places, Boreal and Humid Transition Zones; introduced about Seattle and Pullman, Washington; also on the Atlantic coast. Native of Europe. May–July.

6. *Stellaria longipes* Goldie. Long-stalked Starwort. Fig. 1663.

Stellaria longipes Goldie, Edinb. Phil. Journ. 6: 327. 1822.

Alsine longipes Coville, Contr. U.S. Nat. Herb. 4: 70. 1893.

Stems erect or ascending, tufted, simple or sparingly branched, 1-3 dm. high, glabrous or sparingly pubescent. Leaves lanceolate or linear-lanceolate, 1-3 cm. long, erect or ascending, rigid, the midrib prominent, green or glaucous; flowers solitary or few, terminal on long slender erect pedicels; bracts scarious or (especially when the flowers are solitary) foliaceous, lanceolate; sepals lanceolate or ovate-lanceolate, acute, 3.5-5 mm. long, scarious-margined; petals longer than the sepals, 2-cleft; capsule ovoid, longer than the calyx; seeds smooth.

Moist soils, Transition Zones; Alaska to Nova Scotia and south to southern California, New Mexico, and Minnesota. Type locality: "Woods near Lake Ontario." May-Aug.

7. *Stellaria borealis* Bigelow. Northern Starwort. Fig. 1664.

Stellaria borealis Bigelow, Fl. Bost. ed. 2. 182. 1824.

Stellaria calycantha Bong. Mém. Acad. St.-Petersb. VI. 2: 127. 1832.

Alsine borealis Britt. Mem. Torrey Club 5: 149. 1894.

Stems slender, ascending, 1-3 dm. high, simple or branching, glabrous or essentially so. Leaves sessile, ovate to ovate-lanceolate, thin and soft, ciliolate at the base, 7-25 mm. long; flowers solitary on axillary pedicels, or in older plants forming terminal leafy-bracted cymes; pedicels slender, ascending, 2-3 cm. long; sepals acute, scarious-margined, 2-3.5 mm. long; petals minute or absent; capsules broadly ovoid, obtuse, 3-4 mm. long; seeds light brown, faintly reticulate.

Moist soils, Boreal Zones; circumpolar, extending south on the Pacific coast to southern California, and in eastern North America to Massachusetts and New York. Type locality: White Mountains, New Hampshire. June-Aug.

Stellaria borealis var. *Simcoeii* (Howell) Fernald, Rhodora 16: 150. 1914. Closely resembling the typical species, but the stems more or less densely pilose. Wet places, Boreal Zones; Washington to northern California and Montana.

Stellaria borealis var. *Bongardiiana* Fernald, op. cit. 151. Leaves linear-lanceolate, rather firm, 2-4 cm. long; flowers axillary on spreading or recurved pedicels, or in diffuse leafy-bracted terminal cymes; sepals lanceolate, very acute, 4-5.5 mm. long; capsule oblong-ovoid, 5-8 mm. long; seeds brown, reticulate. Wet places, Humid Transition and Canadian Zones; Alaska to southern California and Quebec. This is the most common form of the species in the Pacific States.

Stellaria borealis var. *sitchana* (Steudel) Fernald, op. cit. 151. Closely resembling the variety *Bongardiiana*, but the diffuse cymes with small scarious-margined bracts. Wet shady places, Humid Transition and Canadian Zones; Alaska to western Oregon and Idaho.

8. *Stellaria crispa* Cham. & Schl. Chamisso's Starwort. Fig. 1665.

Stellaria crispa Cham. & Schl. Linnaea 1: 51. 1826.

Alsine crispa Holz. Contr. U.S. Nat. Herb. 3: 216. 1895.

Perennial by slender creeping rootstocks, glabrous throughout, the stems very slender and weak, decumbent or prostrate, simple or nearly so, 2-4 dm. long. Leaves ovate, short-acuminate, sessile or very short-petioled, thin, the margins often crisped; pedicels axillary, 6-20 mm. long; sepals lanceolate, 2.5-4 mm. long, scarious-margined, 3-nerved; petals usually wanting, when present shorter than the sepals and deeply cleft; capsules acutish, exceeding the calyx; seeds reticulate.

Shady banks and edges of thickets, Humid Transition and Canadian Zones; Alaska to the Sierra Nevada, California. Type locality: "Unalashka." May-July.

Stellaria viridula (Piper) St. John in St. John & Warren, Prelim. List Pl. Kaniku Nat. For. 1: 6. 1925. (*Alsine viridula* Piper, Contr. U.S. Nat. Herb. 16: 207. 1913.) Closely related to *S. crispa* but more compact, forming dense mats 1-2 dm. across; capsules ovoid, not exceeding the calyx; seeds dark brown, 0.5 mm. long. Along rivulets in woods, about 4,500 feet altitude, Blue Mountains, Columbia County, Washington, is the only known station in the Pacific States. Type locality: Weissner's Peak, Idaho.

9. *Stellaria washingtoniana* Robinson. Washington Starwort. Fig. 1666.

Stellaria washingtoniana Robinson, Bot. Gaz. 25: 166. 1898.

Alsine washingtoniana Heller, Cat. N. Amer. Pl. ed. 2. 4. 1900.

Annual, pubescent throughout with spreading hairs, the stems slender, simple or branched, decumbent or prostrate, 5-15 cm. long. Leaves ovate, acute, 5-10 mm. long, thin and delicate, abruptly narrowed at base to a short petiole; pedicels solitary in the axils, very slender, 10-15 mm. long, 1-flowered; sepals 4, narrowly ovate, obtuse, 2-3 mm. long, scarious-margined; petals none; capsule ovoid, obtuse, scarcely exceeding the calyx; seeds reddish brown, faintly reticulate.

Moist mossy spots, Boreal Zones; Cascade (Mount Rainier) and Olympic Mountains, Washington. Type locality: in alder woods of the upper valley of the Nesqually upon slopes of Mount Rainier. July-Aug.

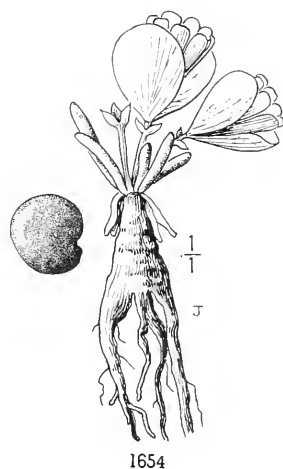
10. *Stellaria obtusa* Engelm. Rocky Mountains Starwort. Fig. 1667.

Stellaria obtusa Engelm. Bot. Gaz. 7: 5. 1882.

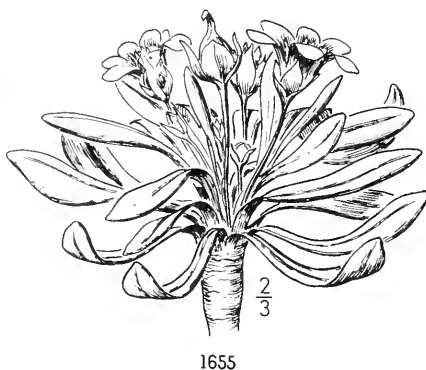
Alsine obtusa Rose, Contr. U.S. Nat. Herb. 3: 569. 1896.

Perennial, glabrous, the stems prostrate, numerous, 5-15 cm. long. Leaves ovate, acute, 8-10 mm. long, thin; pedicels solitary in the axils, about equaling the leaves, 1-flowered; sepals ovate, obtuse, the margins not scarious; capsule ovoid, obtuse, exceeding the calyx.

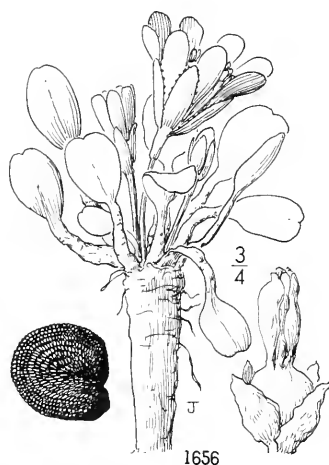
Moist places, Boreal Zones; British Columbia south to the Blue Mountains and Olympic Peninsula, Washington, east to Alberta, Colorado, and Utah. Type locality: western Colorado on the tributaries of the Gunnison River, altitude 9,000 to 10,000 feet. July-Aug.



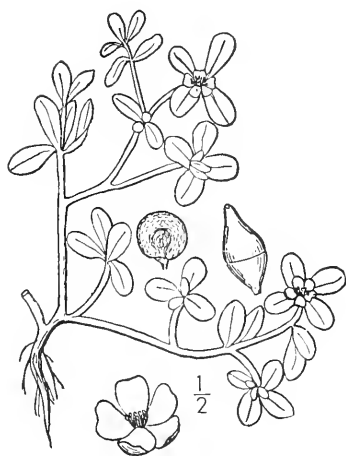
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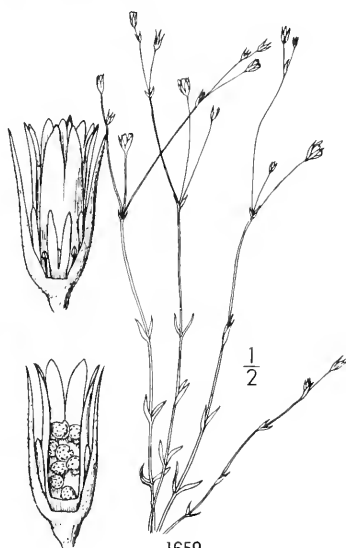
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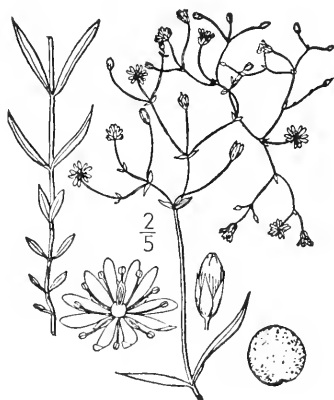
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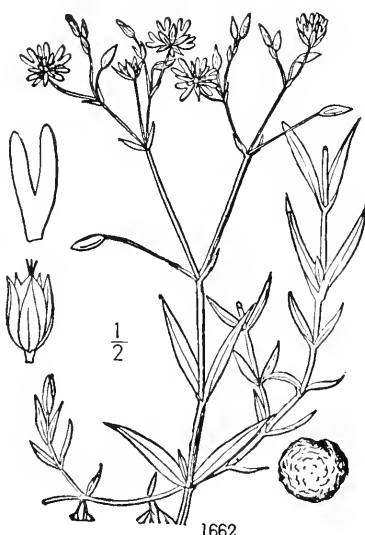
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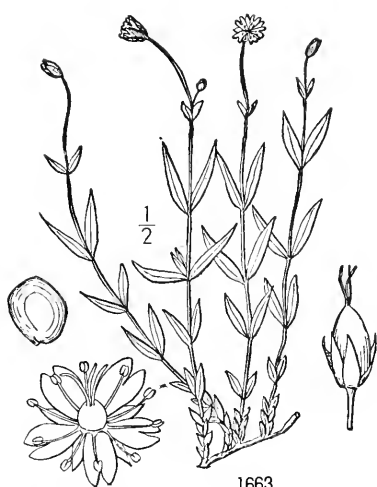


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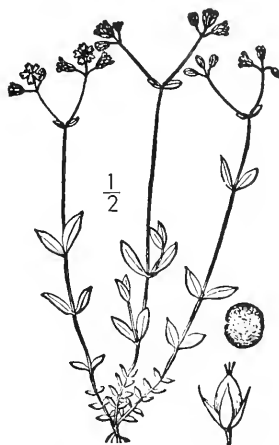
1654. *Lewisia disepala*
1655. *Lewisia brachycalyx*
1656. *Lewisia Kelloggii*

1657. *Portulaca oleracea*
1658. *Stellaria media*
1659. *Stellaria nitens*

1660. *Stellaria umbellata*
1661. *Stellaria longifolia*
1662. *Stellaria graminea*



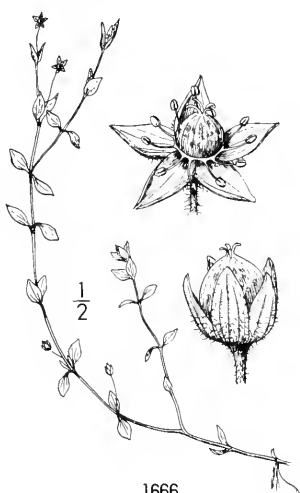
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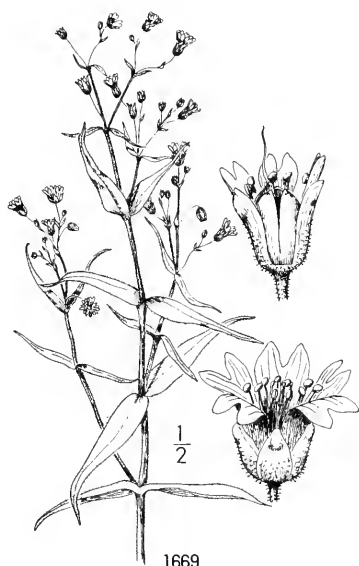
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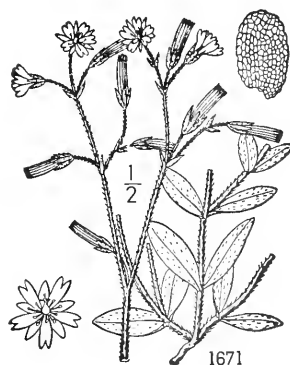
1668



1669



1670



1671

1663. *Stellaria longipes*
 1664. *Stellaria borealis*
 1665. *Stellaria crispa*

1666. *Stellaria washingtoniana*
 1667. *Stellaria obtusa*
 1668. *Stellaria littoralis*

1669. *Stellaria Jamesiana*
 1670. *Cerastium viscosum*
 1671. *Cerastium vulgatum*

11. *Stellaria littoralis* Torr. Beach Starwort. Fig. 1668.*Stellaria littoralis* Torr. Pacif. R. Rep. 4: 69. 1857.*Alsine littoralis* Greene, Man. Bay Reg. 34. 1894.

Perennial, villous-pubescent throughout, the stems decumbent, 2–4 dm. long, dichotomously branched. Leaves ovate-lanceolate, 15–40 mm. long, acute or short-acuminate; flowers mostly terminal in leafy-bracted diffuse cymes; sepals 5–6 mm. long, lanceolate, with broad scarious margins; petals about equaling the sepals, cleft nearly to the base; capsule oblong-ovoid, exceeding the sepals; seeds light brown, very faintly reticulate.

Bogs and marshes along the coast, Humid Transition Zone; Humboldt County to San Francisco, California. Type locality: Point Reyes, California. May–July.

12. *Stellaria Jamesiana* Torr. Sticky Starwort. Fig. 1669.*Stellaria Jamesiana* Torr. Ann. Lyc. N.Y. 2: 169. 1828.*Stellaria Jamesii* of authors.*Alsine Jamesiana* Heller, Cat. N. Amer. Pl. ed. 2. 4. 1900.

Perennial, glandular-pubescent throughout or glabrate below, the stems more or less diffusely branching, erect or ascending, 10–35 cm. long. Leaves lanceolate to linear-lanceolate, 5–10 cm. long; flowers in loose leafy-bracted terminal and axillary cymes; sepals oblong-lanceolate, 4–6 mm. long, broadly scarious-margined; petals well exceeding the sepals, rather deeply lobed; capsule broadly ovoid, shorter than the calyx.

Mountain meadows, Arid Transition Zone; Mount Stuart and the Wenatchee Mountains, Washington to the southern Sierra Nevada, California, east to Colorado and New Mexico. Type locality: Rocky Mountains. May–July.

2. *CERASTIUM* L. Sp. Pl. 437. 1753.

Annual or perennial, pubescent or hirsute herbs, with terminal dichotomous cymes of white flowers. Sepals 5 or rarely 4. Petals of the same number as the sepals, or rarely wanting, emarginate or bifid. Stamens 10 or rarely fewer. Styles equal in number to the sepals and opposite them, or fewer. Capsule cylindrical, often curved, dehiscent by twice as many valves as styles. Seeds many, rough. [Name Greek, meaning horny, in reference to the horn-like capsules of many species.]

About 50 species, of world-wide distribution but most abundant in the temperate zones. Type species, *Cerastium arvense* L.

Petals equaling or shorter than the sepals.

Flowers glomerate; pedicels not longer than the calyx.

Flowers cymose; pedicels at length longer than the calyx.

Petals decidedly longer than the sepals.

Perennial; sepals 3–8 mm. long.

Annual, viscid-pubescent; sepals 3–4 mm. long.

Pedicels not over twice the length of the calyx.

Pedicels much longer than the calyx.

1. *C. viscosum*.2. *C. vulgatum*.3. *C. arvense*.4. *C. brachypodum*.5. *C. nutans*.1. *Cerastium viscosum* L. Mouse-ear Chickweed. Fig. 1670.*Cerastium viscosum* L. Sp. Pl. 437. 1753.*Cerastium acutatum* Suksdorf, Werdenda 1: 9. 1923.

Annual, the stems simple or tufted, decumbent or ascending, 1–3 dm. long, densely viscid-pubescent. Leaves elliptic-ovate to obovate, the lower often spatulate, 1–2 cm. long; bracts small, herbaceous; flowers in glomerate cymes; pedicels mostly shorter than the calyx; sepals 3.5–4.5 mm. long, acute; petals shorter than the sepals, 2-cleft.

Common especially in fields and waste places; naturalized from Europe and widespread over the Pacific States and across the continent. March–June.

Cerastium viscosum var. *apetalum* (Dumort) Fenzl. Like the typical species except the petals are wanting. Naturalized at San Diego, California.

2. *Cerastium vulgatum* L. Larger Mouse-ear Chickweed. Fig. 1671.*Cerastium vulgatum* L. Sp. Pl. ed. 2. 627. 1762.*Cerastium triviale* Link, Enum. Hort. Ber. 1: 433. 1821.

Biennial or perennial, viscid-pubescent throughout, the stems simple or usually tufted, decumbent or ascending, 1–4 dm. long. Upper leaves oblong, the lower oblong-spatulate, 10–25 mm. long, acute or obtuse; bracts small, scarious-margined; flowers in loose cymes; pedicels becoming much longer than the calyx; sepals 4–6 mm. long; petals about equaling the sepals, 2-cleft; capsule about twice the length of the calyx, often curved upward.

A common lawn and pasture weed, naturalized from Europe and widely spread over the Pacific States and across the continent. March–July.

3. *Cerastium arvense* L. Field or Meadow Chickweed. Fig. 1672.*Cerastium arvense* L. Sp. Pl. 438. 1753.*Cerastium arvense* var. *maximum* Hollick & Britt. Bull. Torrey Club 14: 47. 1887.*Cerastium patulum* Greene, Pittonia 4: 302. 1901.*Cerastium Sonnei* Greene, Pittonia 4: 303. 1901.

Perennial, the stems tufted, erect or ascending, pubescent or nearly glabrous, the flowering

stems sparingly branched above, 1–3 dm. high. Basal leaves subulate-linear to linear-oblong, 15–35 mm. long, narrowed at the base, rather crowded, those of the flowering stems distant and somewhat reduced; flowers loosely cymose, rather few; pedicels slender, elongated, erect; sepals 5–7 mm. long, lanceolate, acute; petals obcordate, much exceeding the calyx; capsule only slightly longer than the sepals.

Dry open prairies and hillsides, Boreal and Transition Zones; Alaska south to central California and across the continent; also in Eurasia. A polymorphic species of wide geographical distribution. Type locality: Europe. May–Aug.

4. *Cerastium brachypodum* (Engelm.) Robinson. Short-stalked Chickweed. Fig. 1673.

Cerastium nutans brachypodum Engelm. ex A. Gray, Man. ed. 5. 94. 1867.

Cerastium brachypodum Robinson ex Britt. Mem. Torrey Club 5: 150. 1894.

Annual, viscid-pubescent or puberulent throughout, the stems tufted, erect or ascending, 8–25 cm. high. Lower leaves oblanceolate to spatulate, obtuse or acutish, 6–25 mm. long, narrowed at base to a short petiole, the upper leaves linear to linear-oblong, sessile; cymes terminal, few to several-flowered; pedicels often deflexed in fruit, a little exceeding to about twice as long as the calyx; sepals broadly lanceolate, obtuse or acutish, about 4 mm. long; petals 5–6 mm. long; capsule 10 mm. long.

Moist places, especially about springs; eastern Oregon and Nevada, eastward to the Atlantic States. Type locality: St. Louis, Missouri. April–Aug.

5. *Cerastium nutans* Raf. Nodding Chickweed, Powder-horn. Fig. 1674.

Cerastium longepedunculatum Muhl. Cat. 46. nom. nudum. 1813.

Cerastium nutans Raf. Préc. Découv. 36. 1814.

Annual, finely viscid-pubescent to glabrous, bright green, the stems weak, ascending or reclining, diffusely branched, 15–30 cm. long. Lower leaves spatulate, obtuse, 15–25 mm. long, narrowed to a short petiole, the upper lanceolate, shorter, sessile, glandular; cymes loosely few-flowered; pedicels slender, often 15–20 mm. long, usually erect with the tip nodding; sepals lanceolate, acutish, 4–5 mm. long; petals nearly twice as long as the calyx; capsule 10–15 mm. long.

Moist shaded places, Boreal and Transition Zones; along the Columbia River, western Oregon (Rooster Rock), Idaho, Utah, and Arizona, east across the continent to Nova Scotia and South Carolina. Type locality: not ascertained. April–June.

3. *HOLÓSTEUM* L. Sp. Pl. 88. 1753.

Low annual herbs, often viscid-pubescent above. Flowers cymose-umbellate on long terminal peduncles. Sepals and petals 5, the latter emarginate or erose. Stamens 3–5, hypogynous. Styles 3. Ovary 1-celled, many-ovuled. Capsule ovoid-cylindric, dehiscent by 6 short valves or teeth. Seeds many, compressed, rough. [Name Greek, signifying all bone, an antiphrase, the plants being tender.]

A genus of 3 species, natives of Europe and temperate Asia. Type species, *Holosteum umbellatum* L.

1. *Holosteum umbellatum* L. Jagged Chickweed. Fig. 1675.

Holosteum umbellatum L. Sp. Pl. 88. 1753.

Plants tufted, 8–25 cm. high, the branches mostly simple, glandular-pubescent above, sparingly tomentose below. Leaves oblong or the basal oblanceolate, sessile, 1–2 cm. long; umbels 3–8-flowered; pedicels very slender, 15–25 mm. long, reflexed in fruit; sepals obtuse, 4 mm. long, scarious-margined; petals erose, slightly longer than the sepals; capsule ovoid, about 8 mm. long, its teeth recurved.

Sparingly introduced in eastern Oregon, Washington, and also in the Atlantic States. Native of Europe and northern Asia. April–May.

4. *SAGÏNA* L. Sp. Pl. 128. 1753.

Low tufted annual or perennial herbs, with subulate leaves and small whitish flowers on slender axillary pedicels. Sepals 4 or 5. Petals of the same number or wanting, entire or emarginate. Stamens of the same number as sepals or twice as many, or sometimes fewer. Styles as many as sepals and alternate with them. Capsule at length dehiscent to the base, the valves as many as sepals and opposite them. Seeds many, smooth or sometimes resinous-dotted. [Ancient name of the spurry.]

A genus of about 10 species, natives of the northern hemisphere. Type species, *Sagina procumbens* L.

Sepals 4; annuals.

Petals none; plants glandular-pubescent; lower leaves long-ciliate.

Petals present; plants glabrous; leaves not ciliate.

Sepals and petals 5.

Stems filiform, not at all fleshy.

Annual, without sterile rosettes at base, loosely branched.

Perennial, with sterile rosettes at base, often tufted.

Stems stout, somewhat fleshy; perennial with basal rosettes.

1. *S. apetala barbata*.

2. *S. procumbens*.

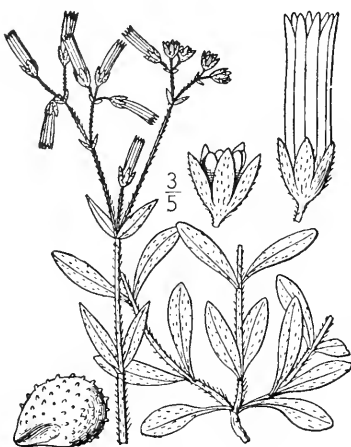
3. *S. occidentalis*.

4. *S. saginoides hesperia*.

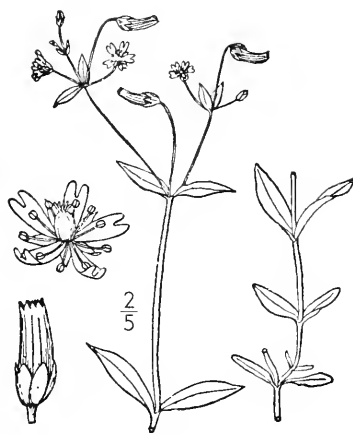
5. *S. crassicaulis*.



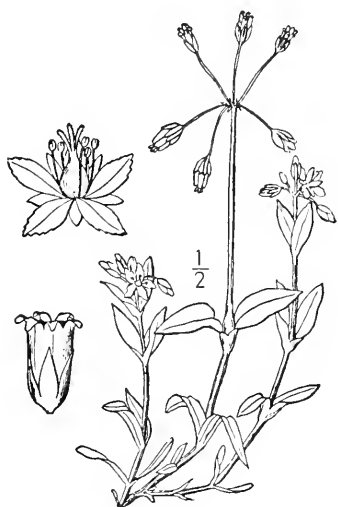
1672



1673



1674



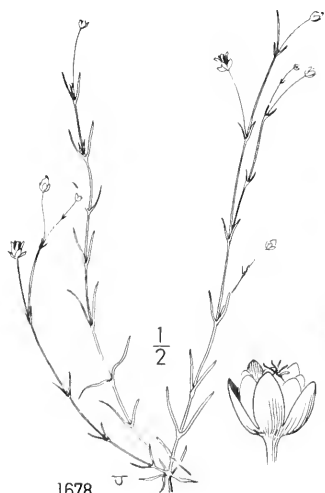
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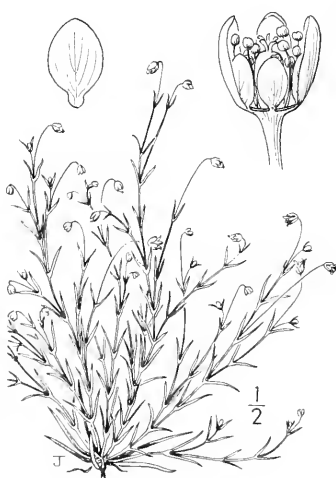
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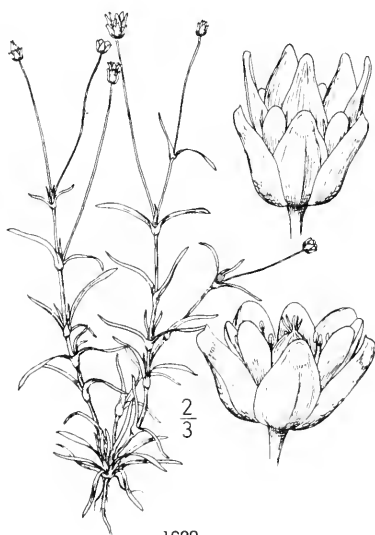
1677



1678



1679



1680

1672. *Cerastium arvense*1673. *Cerastium brachypodum*1674. *Cerastium nutans*1675. *Holosteum umbellatum*1676. *Sagina apetala*1677. *Sagina procumbens*1678. *Sagina occidentalis*1679. *Sagina saginoides*1680. *Sagina crassicaulis*

1. *Sagina apétala* var. *barbàta* Fenzl. Sticky Pearlwort. Fig. 1676.

Sagina apétala var. *barbàta* Fenzl ex Ledeb. Fl. Ross. 1: 338. 1842.

Alsinella ciliata Greene, Fl. Fran. 126. 1891.

Sagina ciliata Heller, Muhlenbergia 1: 50. 1904.

Annual, more or less glandular, stems few to numerous, erect or ascending, 3–5 cm. high. Leaves linear-subulate, involute, 3–5 mm. long, long-ciliate toward the base, tipped with a short bristle at apex; pedicels 3–10 mm. long; sepals 4, oval, obtuse, scarcely 2 mm. long; petals wanting; capsule barely exceeding the calyx; seeds minutely muricately rugulose under high magnification.

Wayside and waste places; western Washington to southern California. Native of Europe and Asia. Type locality: Russia. April–June.

2. *Sagina procúbens* L. Procumbent Pearlwort. Fig. 1677.

Sagina procumbens L. Sp. Pl. 128. 1753.

Annual or sometimes perennial, branching from the base, decumbent to depressed, glabrous, 3–8 cm. high. Leaves narrowly linear, subulate, 2–6 mm. long; peduncles capillary, well exceeding the leaves; sepals 4 rarely 5, oblong-ovate, obtuse; petals shorter than the sepals, rarely wanting; stamens 4 or 5; capsule scarcely exceeding the sepals, often nodding in fruit; seeds finely reticulate but not roughened.

Moist places near the coast, mainly Boreal Zones; British Columbia and the Olympic Peninsula, Washington, to northwestern California; also on the Atlantic coast. Native of Europe and Asia. May–Sept. Poverty.

3. *Sagina occidentàlis* S. Wats. Western Pearlwort. Fig. 1678.

Sagina occidentalis S. Wats. Proc. Amer. Acad. 10: 344. 1875.

Alsinella occidentalis Greene, Fl. Fran. 125. 1891.

Annual, glabrous or the pedicels and calyx sometimes more or less glandular, the stems few to many from the base, 4–12 cm. long, ascending or decumbent. Leaves nearly filiform, not forming persistent rosettes at the base; pedicels 5–20 mm. long; sepals 5, oblong-ovate, obtuse, 2 mm. long; petals a little shorter than the sepals; capsules 3 mm. long.

Moist ground, Transition and Sonoran Zones; Vancouver Island to southern California, east to Idaho. Type locality: not stated. March–June.

4. *Sagina saginoides* var. *hespéria* Fernald. Arctic Pearlwort. Fig. 1679.

Sagina saginoides var. *hesperia* Fernald, Rhodora 27: 131. 1925.

Perennial, glabrous, tufted, 3–10 cm. high. Leaves linear-subulate or filiform, 4–10 mm. long; pedicels solitary and terminal or occasionally one or more in the upper axils, 5–20 mm. long, often curved at the summit; sepals 5, oval, obtuse, 1.5–2 mm. long; petals a little shorter than the sepals; capsule 3 mm. long.

Moist places, mainly Boreal Zones; British Columbia to southern California, Alberta, Nevada, Utah, and Colorado. Type locality: Chambers Lake, altitude 9,500 feet, Colorado. June–Aug.

Typical *S. saginoides* (L.) Britton (*S. Linnaei* Presl) occurs in arctic America and Eurasia. It has the sepals 2–3 mm. long.

5. *Sagina crassicaulis* S. Wats. Beach Pearlwort. Fig. 1680.

Sagina crassicaulis S. Wats. Proc. Amer. Acad. 18: 191. 1883.

Alsinella crassicaulis Greene, Fl. Fran. 125. 1891.

Perennial from a stout root, glabrous and distinctly fleshy, the stems several to many, not filiform, branching, 4–12 cm. long. Basal leaves forming a persistent rosette, linear, 15–30 mm. long, the upper shorter, connate by broad scarious bases; pedicels usually elongated, 1–4 cm. long, straight; flowers 5-merous; sepals broadly oval, 3 mm. long; petals scarcely as long as the sepals; capsule 4 mm. long.

Moist places along the coast, Canadian and Transition Zones; Aleutian Islands and Vancouver Island to Monterey County, California. Type locality: Dillon's Beach, Marin County, California. June–Dec.

5. ARENÀRIA L. Sp. Pl. 423. 1753.

Annual or perennial herbs, with sessile leaves and terminal cymose or capitate, rarely axillary and solitary flowers. Sepals 5. Petals 5 or rarely wanting, entire or slightly emarginate. Stamens 10. Styles 2–5, commonly 3. Ovary 1-celled, many-ovuled. Capsule spherical or oblong, dehiscent by as many or by twice as many valves or teeth as styles; seeds reniform or globose. [Name Latin, meaning sand, in reference to the habitat of many species.]

A genus of wide geographical distribution comprising about 150 species. Type species, *Arenaria serpyllifolia* L.

Valves of the capsule entire.

Annuals.

Petals broadly obovate, well exceeding the sepals; seeds flattened and broadly margined.

1. *A. Douglasii*.

Petals oblong and about equaling or exceeding the sepals, or minute or wanting.

Sepals nerveless, glandular-pubescent.

2. *A. Howellii*.

Sepals more or less strongly 1–3-nerved; or if nerveless the plants glabrous.

- Plants glabrous throughout.
 Petals about twice the length of the sepals; seeds roughened. 3. *A. californica*.
 Petals minute or wanting; seeds smooth. 4. *A. pusilla*.
 Plants, at least the pedicels, more or less glandular-puberulent; sepals very strongly 3-nerved. 5. *A. tenella*.
- Perennials.
 Plants with weak elongated subsimple stems, growing in mud and rooting at the joints. 6. *A. paludicola*.
 Plants tufted, not palustrine.
 Sepals acute or acuminate.
 Leaves pungent, squarrose; sepals 1-nerved or indistinctly 3-nerved. 7. *A. Nuttallii*.
 Leaves not pungent, mostly erect; sepals strongly 3-nerved. 8. *A. propinqua*.
 Sepals oblong, rounded at the apex, 3-nerved. 9. *A. obtusiloba*.
- Valves of the capsule 2-toothed or -cleft.
 Annuals; leaves ovate. 10. *A. serpyllifolia*.
 Perennials.
 Leaves oblong-linear. 11. *A. confusa*.
 Leaves subulate.
 Sepals lanceolate-subulate, 5-6 mm. long. 12. *A. Franklinii*.
 Sepals broadly ovate to ovate-lanceolate.
 Inflorescence loosely cymose, the flowers on more or less elongated pedicels, often solitary in *compacta*.
 Flowering stems less than 2 dm. high; sepals 2.5-4 mm. long.
 Sepals broadly ovate, obtuse or rounded at the apex.
 Leaves 20-30 mm. long, usually curved, not rigid. 13. *A. formosa*.
 Leaves 5-15 mm. long, abruptly and minutely apiculate, straight and rigid. 14. *A. ursina*.
- Sepals narrowly ovate, acute; leaves rather rigid.
 Leaves 10-30 mm. long.
 Leaves not rigidly pungent, ascending. 15. *A. pumicola*.
 Leaves conspicuously rigidly pungent, and in age widely spreading. 16. *A. aculeata*.
 Leaves 3-5 mm. long, rosulate-spreading; flowers usually solitary on the short (2-5 cm.) stems. 17. *A. compacta*.
 Flowering stems usually 2-3 dm. high; sepals 4-6 mm. long. 18. *A. macradenia*.
 Inflorescence not cymose; plants glabrous.
 Flowers in small few-flowered glomerules at the ends of the branches, subsessile. 19. *A. Burkei*.
 Flowers capitate or umbellate. 20. *A. congesta*.

1. *Arenaria Douglasii* Fenzl. Douglas' Sandwort. Fig. 1681.

Arenaria Douglasii Fenzl ex Torr. & Gray, Fl. N. Amer. 1: 674. 1840.

Alsinopsis Douglasii Heller, Muhlenbergia 8: 20. 1912.

Minuartia Douglasii Mattf. Bot. Jahrb. 57. Beibl. 126: 27. 1921.

Glabrous or sparsely glandular-pubescent annual, stem slender, much branched, 5-30 cm. high. Leaves filiform, 8-20 mm. long; flowers many, loosely cymose; pedicels filiform, 1-3 cm. long; sepals narrowly ovate, with narrow membranous margin, 2.5-3 mm. long, 1-3-nerved; petals obovate, well exceeding the sepals; capsule subglobose, slightly exceeding the sepals; seeds about 1.5 mm. broad, reniform, broadly margined, smooth or with inconspicuous radiating striae.

Dry sandy or rocky places, Upper Sonoran Zone; Rogue River Valley, Oregon, to northern Lower California. Type locality: California, collected by Douglas. April-June.

2. *Arenaria Howellii* S. Wats. Howell's Sandwort. Fig. 1682.

Arenaria Howellii S. Wats. Proc. Amer. Acad. 20: 354. 1885.

Alsinopsis Howellii Heller, Muhlenbergia 8: 96. 1912.

Minuartia Howellii Mattf. Bot. Jahrb. 57. Beibl. 126: 27. 1921.

Annual, the stems usually simple below, dichotomously branched above, 15-35 cm. high, more or less glandular-pubescent at least below the nodes. Leaves narrowly linear, 7-15 mm. long, rather thick, widely spreading or those of the stem recurved, glandular-pubescent; bracts herbaceous, much reduced; flowers solitary on slender pedicels; sepals ovate, 3 mm. long, nerveless, glandular; petals oblong, 4 mm. long; capsule little exceeding the sepals; seeds slightly tuberculate-crested.

Dry rocky or sandy soils, Arid Transition Zone; Josephine County, Oregon, and Del Norte County, California. Type locality: "In the Coast Mountains near Waldo," Oregon. April-June.

3. *Arenaria californica* (A. Gray) Brewer. California Sandwort. Fig. 1683.

Arenaria brevifolia var. *californica* A. Gray, Proc. Calif. Acad. 3: 101. 1864.

Arenaria californica Brewer, Bot. Calif. 1: 69. 1876.

Minuartia californica Mattf. Bot. Jahrb. 57. Beibl. 126: 28. 1921.

Alsinopsis californica Heller, Muhlenbergia 8: 20. 1912.

A diminutive glabrous annual, usually much branched from the base, the branches filiform, 2.5-10 cm. high. Leaves linear-subulate, somewhat fleshy, 2-4 mm. long, obtuse; sepals oblong-ovate, 2-3 mm. long, with a prominent or obscure midrib; petals oblong, 3-4 mm. long; seeds minute, finely roughened.

Dry ridges in sandy or rocky soils, Upper Sonoran and Transition Zones; Rogue River Valley, Oregon, south in the Coast Ranges and Sierra Nevada to the Tehachapi Mountains, California. Type locality: "In the valleys among high ridges in Sonoma," California. March-May.

4. *Arenaria pusilla* S. Wats. Dwarf Sandwort. Fig. 1684.

Arenaria pusilla S. Wats. Proc. Amer. Acad. 17: 367. 1882.

Alsinopsis pusilla Rydb. Bull. Torrey Club 39: 316. 1912.

Minuartia pusilla Mattf. Bot. Jahrb. 57. Beibl. 126: 28. 1921.

A very diminutive glabrous annual, usually much branched from the base, the branches filiform, 2.5–5 cm. high. Leaves linear-subulate, 2–4 mm. long, obtuse and somewhat fleshy; sepals narrowly lanceolate, acuminate or acute, 2–3 mm. long, nerveless or obscurely 1-nerved; petals 1–2 mm. long, or none; capsule equaling the sepals; seeds smooth.

Sandy soils, Upper Sonoran and Arid Transition Zones; Whitman County, eastern Washington, to Siskiyou County, California. Type locality: Yreka, California. April–May.

5. *Arenaria tenella* Nutt. Slender Sandwort. Fig. 1685.

Arenaria tenella Nutt. in Torr. & Gray, Fl. N. Amer. 1: 179. 1838.

Greniera tenella Gay, Ann. Sci. Nat. III, 4: 27. 1845.

Alsine tenella Torr. Bot. Wilkes Exp. 243. 1874.

Alsinopsis tenella Heller, Muhlenbergia 8: 96. 1912.

Minuartia tenella Mattf. Bot. Jahrb. 57. Beibl. 126: 29. 1921.

Slender annual, the stems usually simple below, dichotomously branched above, 8–25 cm. high, glandular-pubescent. Leaves subulate, 5–15 mm. long, prominently ribbed, the upper reduced; pedicels filiform; sepals lanceolate, 2.5–3 mm. long, prominently 3-nerved; petals oblong, equaling or exceeding the sepals; capsule exceeding the sepals, ovoid; seeds with a finely muriculate crest.

Dry soils in open grasslands, Humid Transition Zone; British Columbia to northwestern Oregon. Type locality: "Rocky places, plains of the Oregon." May–July.

6. *Arenaria paludicola* Robinson. Swamp Sandwort. Fig. 1686.

Arenaria paludicola Robinson, Proc. Amer. Acad. 29: 298. 1894.

Alsine palustris Kell. Proc. Calif. Acad. 3: 61. 1863.

Arenaria palustris S. Wats. Bot. Calif. 1: 70. 1876. Not Gay, 1845.

A palustrine glabrous perennial, the stems usually simple, elongated, weak and flaccid, conspicuously sulcate, procumbent and rooting at the nodes, leafy throughout. Leaves linear-lanceolate, 1–3 cm. long, 2–6 mm. wide, sparingly scabrous on the margins; pedicels solitary in the axils, 2–4 cm. long; sepals 3 mm. long, ovate-lanceolate, acute, nerveless; petals oblong-obovate, 5–6 mm. long.

Swamps, Transition and Upper Sonoran Zones; near Tacoma, Washington, and San Francisco, Santa Barbara, and Los Angeles, California. Possibly more generally distributed but rarely collected. Type locality: San Francisco. May–Aug.

7. *Arenaria Nuttallii* Pax. Nuttall's Sandwort. Fig. 1687.

Arenaria pungens Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 179. 1838.

Arenaria Nuttallii Pax, Bot. Jahrb. 18: 30. 1893.

Alsinopsis occidentalis Heller, Muhlenbergia 8: 96. 1912.

Stems many from a perennial taproot, loosely matted, ascending or decumbent, 6–12 cm. long, glandular-villous throughout. Leaves subulate, 6–10 mm. long, crowded, pungent, ascending or commonly recurved-spreading; cymes few- to many-flowered; pedicels 5–15 mm. long; sepals lanceolate, 4–5 mm. long, acuminate; petals shorter than the sepals, oblong-linear; capsule ovoid, shorter than the sepals.

Dry alpine ridges, Boreal Zones; British Columbia to northern California, Montana, Wyoming, and Nevada. Type locality: "Summit of hills in the Rocky Mountain range (lat. 41)." June–Aug. In the Pacific States the typical or Rocky Mountain form of the species is mainly in eastern Oregon where we have specimens from Wallowa, Warner and Steens Mountains. The Cascade Mountains plants of Washington and Oregon are somewhat intermediate between this and the following varieties.

Arenaria Nuttallii var. *gregaria* (Heller) Jepson, Fl. Calif. 492. 1914. (*A. gregaria* Heller, Bull. S. Calif. Acad. 2: 67. 1903.) Plants more densely glandular-villous and cinereous; leaves shorter, rather blunt and not pungent; petals as long as or longer than the sepals, broader. Siskiyou Mountains and North Coast Ranges to Mount Senhedrin, Lake County, California.

Arenaria Nuttallii var. *gracilis* (A. Gray) Robinson, Proc. Amer. Acad. 29: 30. 1894. (*A. pungens* var. *gracilis* A. Gray.) Less glandular-villous; leaves narrowly subulate with an attenuate pungent tip, ascending, rarely spreading; flowers solitary or in few-flowered cymes; petals shorter than the sepals. High altitudes of the central Sierra Nevada to the San Bernardino Mountains, California.

8. *Arenaria propinqua* Richards. Boreal Sandwort. Fig. 1688.

Arenaria propinqua Richards. in Frankl. 1st Journ. Bot. App. 738. 1823.

Arenaria verna var. *hirta* S. Wats. Bot. King Expl. 41. 1871.

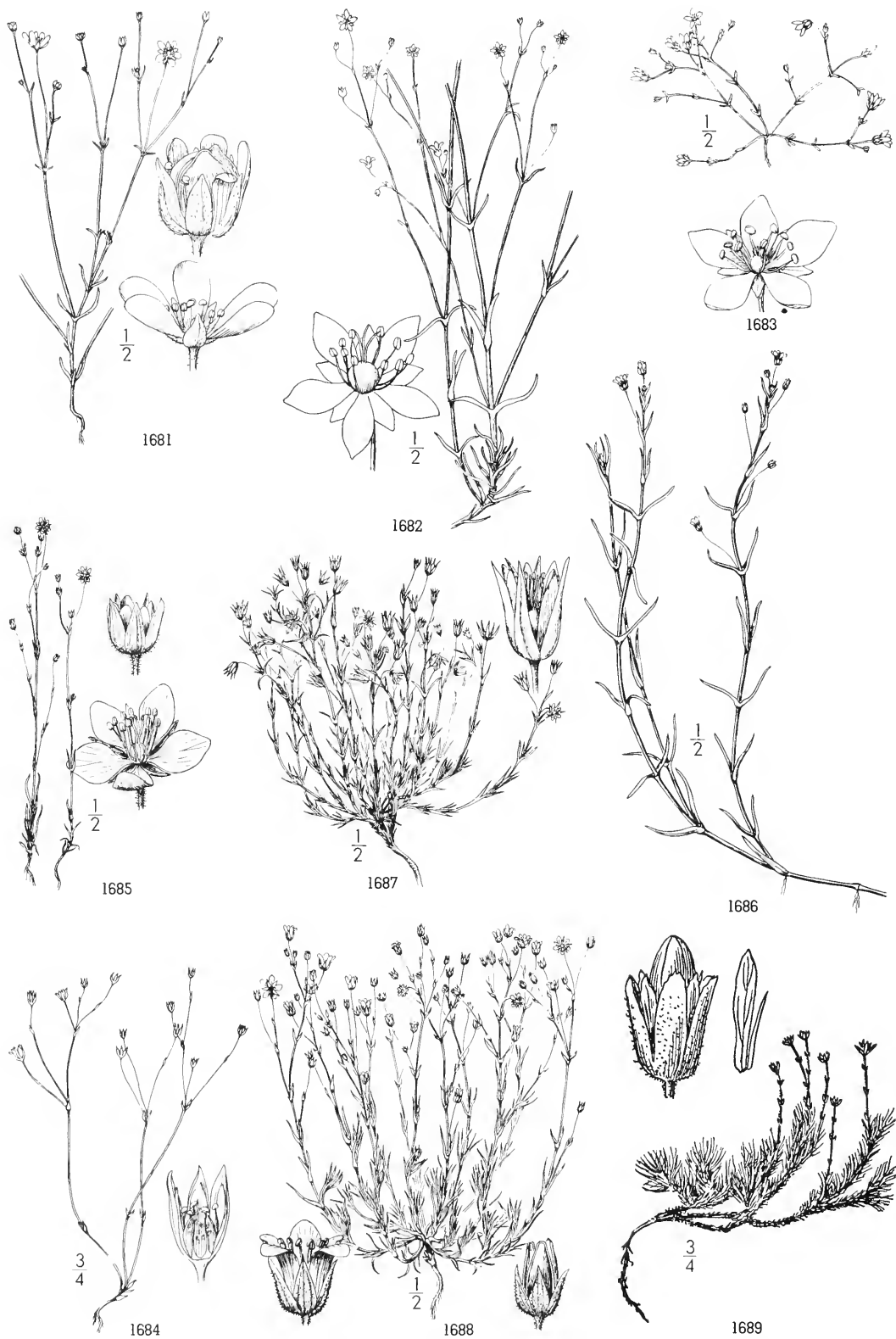
Alsinopsis propinqua Rydb. Bull. Torrey Club 33: 140. 1906.

Arenaria verna var. *propinqua* Fernald, Rhodora 8: 32. 1906.

Arenaria verna var. *pubescens* Fernald, Rhodora 21: 21. 1919.

Plants densely glandular-puberulent, the stems arising from a slender taproot, branched from the base and more or less tufted, 3–10 cm. high. Leaves linear-subulate, flat and strongly 3-nerved, 3–10 mm. long, ascending, pungent; flowers in open cymes; sepals lanceolate, 3 mm. long, 3-nerved; petals about 4 mm. long; capsule a little shorter than the sepals.

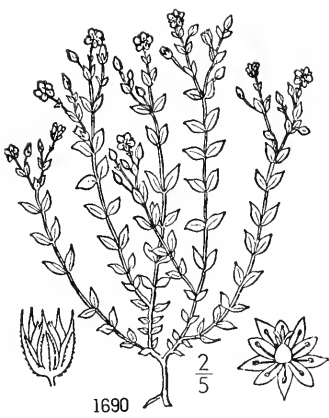
Rocky or sandy soils, Boreal Zones; British Columbia and the Hudson Bay to Siskiyou Mountains, California, and New Mexico. Type locality: northern Canada. June–Aug.



1681. *Arenaria Douglasii*
1682. *Arenaria Howellii*
1683. *Arenaria californica*

1684. *Arenaria pusilla*
1685. *Arenaria tenella*
1686. *Arenaria paludicola*

1687. *Arenaria Nuttallii*
1688. *Arenaria propinqua*
1689. *Arenaria obtusiloba*



1690



1691



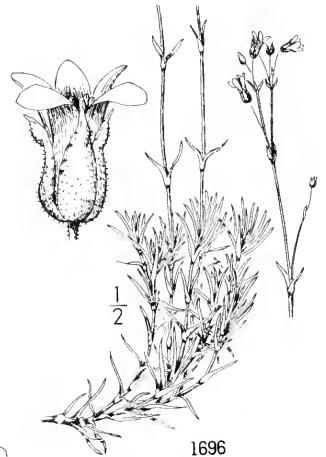
1692



1693



1695



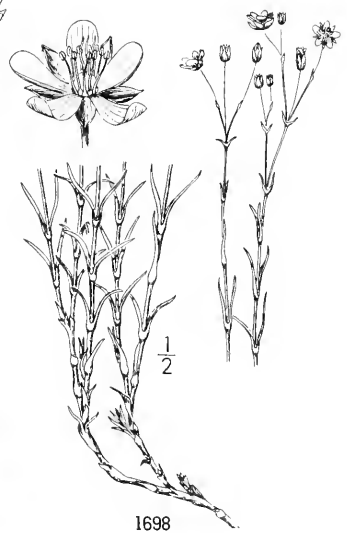
1696



1694



1697



1698

1690. *Arenaria serpyllifolia*
 1691. *Arenaria confusa*
 1692. *Arenaria Franklinii*

1693. *Arenaria formosa*
 1694. *Arenaria ursina*
 1695. *Arenaria pumicola*

1696. *Arenaria aculeata*
 1697. *Arenaria compacta*
 1698. *Arenaria macradenia*

9. *Arenaria obtusiloba* (Rydb.) Fernald. Alpine Sandwort. Fig. 1689.

Arenaria obtusa Torr. Ann. Lyc. N.Y. 2: 170. 1827. Not Ail. 1785.

Arenaria biflora S. Wats. Bibl. Index 94. 1878. Not L. 1767.

Alsinopsis obtusiloba Rydb. Bull. Torrey Club 33: 140. 1906.

Arenaria obtusiloba Fernald, Rhodora 21: 14. 1919.

Low, densely caespitose perennial, the lower parts of the stems clothed with the withered leaves, flowering stems slender, 1–6 cm. high, glandular-pubescent, bearing 1 or 2 pairs of leaves. Lower leaves narrowly linear, 4–8 mm. long, obtuse, rather rigid, ascending, midvein prominent, short-ciliolate on the margins, otherwise usually glabrous; flowers 2 or 3 or usually solitary; sepals oblong-lanceolate, 4 mm. long, obtuse, 3-nerved, glandular-pubescent; petals spatulate, exceeding the sepals; capsule exceeding the sepals, the valves obtuse, entire.

Rocky slopes, Arctic-Alpine Zone; Alaska to Labrador, south in the mountains of the Pacific States to the Sierra Nevada, California, and in the Rocky Mountains to New Mexico. Closely related to the Siberian *Arenaria sajanensis* Willd. Type locality: Rocky Mountains. June–August.

10. *Arenaria serpyllifolia* L. Thyme-leaved Sandwort. Fig. 1690.

Arenaria serpyllifolia L. Sp. Pl. 423. 1753.

Annual, puberulent throughout, much branched from the base, the stems slender, ascending or decumbent, 1–2 dm. high. Leaves ovate, 4–7 mm. long, acute or short acuminate, sessile or the lowest short-petioled; flowers in open leafy-bracted cymes; pedicels 5–10 mm. long; sepals ovate-lanceolate, acuminate, 3 mm. long; petals 2 mm. long; capsule exceeding the sepals, ovoid.

Usually in moist sandy soils, naturalized from Europe, and widely distributed over North America. On the Pacific Coast extending from British Columbia to southern California. April–July.

11. *Arenaria confusa* Rydb. Rydberg's Sandwort. Fig. 1691.

Arenaria confusa Rydb. Bull. Torrey Club 28: 275. 1902.

Stems many from a stout perennial root, prostrate or decumbent, 2–5 dm. long, slender, the whole plant more or less puberulent. Leaves oblong-lanceolate, 5–20 mm. long, acute, mucronate; flowers many, pedicels very slender, 1–2 cm. long; sepals ovate-lanceolate, sharply acuminate, 3 mm. long, glabrous; petals a little shorter than the sepals; capsule ovoid, exceeding the sepals.

Rocky or moist sandy soils, Arid Transition Zone; San Bernardino Mountains, California, and Sierra San Pedro Martir, Lower California, to Texas, Arizona, Colorado, and New Mexico. Type locality: White Mountains, New Mexico. June–September. This species has been confused with *Arenaria saxosa* A. Gray.

12. *Arenaria Franklinii* Dougl. Franklin's Sandwort. Fig. 1692.

Arenaria Franklinii Dougl. ex Hook. Fl. Bor. Amer. 1: 101. pl. 35. 1830.

Plants caespitose, the caudex much branched, with rather slender procumbent branches. Leaves subulate, 1–2 cm. long, minutely scabrous, finely ciliolate on the margins, sharply pungent, but scarcely rigid; flowering stems simple, 5–10 cm. long, leafy; cymes dense, few-flowered, bracts subulate; sepals lanceolate-subulate, 8–10 mm. long, pungent, 1-nerved; petals shorter than the sepals.

Dry rocky or sandy soils, Upper Sonoran Zone; Kittitas County, eastern Washington, to Harney County, Oregon, and adjacent Idaho. Type locality: "Abundant on barren sandy plains and undulating grounds of the Columbia from the Great to the Kettle Falls." May–July.

Arenaria Franklinii var. *Thompsonii* M. E. Peck, Torreya 32: 149. 1932. Leaves mostly appressed or ascending; sepals 5–6 mm. long. Sandy sagebrush plains near Arlington, Gilliam County, Oregon.

13. *Arenaria formosa* Fischer. Beautiful Sandwort. Fig. 1693.

Arenaria formosa Fischer ex DC. Prod. 1: 402. 1824.

Arenaria capillaris Amer. authors. Not Poir.

Cespitose, the branches of the caudex slender, somewhat woody, decumbent. Leaves filiform, 2–7 cm. long, mostly erect and often curved, minutely ciliolate, neither rigid nor pungent; flowering stems 5–15 cm. high, bearing 2 or 3 pairs of leaves, smooth below, glandular above; cymes few-flowered; pedicels 5–20 mm. long; sepals 3–4 mm. long, broadly oval, rounded or broadly obtuse, broadly scarious-margined and usually colored, 1-nerved, glandular-puberulent; petals twice the length of the sepals.

Alpine meadows, Arctic and Hudsonian Zones; British Columbia to Mount Hood, Oregon, east to Alberta, Montana, and Utah. Also in Siberia. July–August.

Arenaria salmonensis Henderson, Bull. Torrey Club 27: 343. 1900. Cespitose perennial, the woody caudex much branched below the surface of the ground; flowering stems 6–8 cm. high, with 1 or 2 pairs of subulate leaves, glabrous below, glandular above and on the inflorescence. Lower leaves subulate, 10–15 mm. long, straight or often curved, minutely serrulate on the margins, glabrous, somewhat rigid and pungent; bracts ovate, scarious; cymes open, few-flowered; sepals ovate, obtuse, 2–3 mm. long, thin and often colored; petals about a half longer; capsules slightly exceeding the sepals. Rocky slopes, Boreal Zones; Blue Mountains of eastern Washington and Oregon to Montana. Type locality: dry gravelly plains, near the source of the Salmon River, Blaine County, Idaho. Probably not specifically distinct from *A. formosa*.

14. *Arenaria ursina* Robinson. Bear Valley Sandwort. Fig. 1694.

Arenaria ursina Robinson, Proc. Amer. Acad. 29: 294. 1894.

Arenaria capillaris var. *ursina* Robinson, Syn. Fl. N. Amer. 1: 240. 1897.

Cespitose, the caudex branches numerous, erect or ascending, distinctly woody. Leaves 4–6 mm. long, straight, subulate, rather stout and rigid, abruptly apiculate, glaucous, ciliolate; flower-

ing stems 6–15 cm. high, glandular-puberulent above; cymes loose, few-flowered, pedicels 5–20 mm. long; sepals broadly oval, 3–4 mm. long, rounded at the apex, broadly scarious-margined, nerveless, glandular-puberulent; petals slightly exceeding the sepals.

Dry hillsides, Arid Transition Zone; known only from Bear Valley, San Bernardino Mountains, California. June–Aug.

15. *Arenaria pumicola* Cov. & Leib. Pumice Sandwort. Fig. 1695.

Arenaria pumicola Cov. & Leib. Proc. Biol. Soc. Wash. 11: 169. 1897.

Cespitose, with a much branched woody caudex. Leaves filiform, 2–5 cm. long, usually ciliate on the margins, at least below, otherwise glabrous or sparsely and minutely glandular, obtuse or rarely abruptly apiculate, but not pungent; flowering stems 8–20 cm. high, glabrous below, glandular above, bearing 1–3 pairs of leaves; cymes open, few- to many-flowered; pedicels 10–25 mm. long; sepals ovate, broadly acute or obtuse, 3.5–4 mm. long, scarious-margined, 1-nerved, usually glandular-pubescent on the midrib; petals 6 mm. long.

Granitic or volcanic sands, mainly Canadian Zone; Cascade Mountains, central Oregon, to the southern Sierra Nevada, California. Type locality: Crater Lake, Oregon. July–Aug.

16. *Arenaria aculeata* S. Wats. Spiny Sandwort. Fig. 1696.

Arenaria aculeata S. Wats. Bot. King Expl. 40. 1871.

Arenaria congesta var. *aculeata* M. E. Jones, Proc. Calif. Acad. II. 5: 626. 1895.

Arenaria Kuschei Eastw. Proc. Calif. Acad. IV. 20: 140. 1931.

Plants perennial with a cespitose woody caudex, the flowering stems 1–2 dm. high, glabrous or sparingly glandular above, bearing 1 or 2 pairs of leaves. Basal leaves rigidly spreading and pungent, glabrous and glaucous; bracts of the inflorescence small, mostly scarious; pedicels slender, 8–15 mm. long, more or less glandular; sepals ovate, acute, 4 mm. long; petals 5–6 mm. long; capsule usually about twice as long as the sepals.

Dry mountain ranges, Arid Transition Zone; Great Basin region, extending from eastern Oregon and central Idaho south, east of the Sierra Nevada, to the Mojave Desert, California, and Arizona. Type locality: Fremont's Pass, East Humboldt Mountains, Nevada, 6,500 feet altitude. June–Aug.

Arenaria uintahensis A. Nels. Bull. Torrey Club 26: 7. 1899. This species is closely related to *A. aculeata* and perhaps not specifically distinct. The leaves are similar, being rigidly pungent, but less spreading; capsules but little exceeding the sepals. It also belongs to the Great Basin region extending from eastern Oregon to Wyoming and Nevada. Type locality: on higher bluffs overlooking Bear River, Cokeville, Uintah County, Wyoming.

17. *Arenaria compacta* Coville. Compact Sandwort. Fig. 1697.

Arenaria compacta Coville, Proc. Biol. Soc. Wash. 7: 67. 1892.

Perennial with a thick woody much branched caudex forming a dense mat only 1 or 2 cm. high, flowering stems usually with only 1 pair of leaves, 2–6 cm. high, glandular-pubescent. Leaves subulate, squarrose and pungent, 3–6 mm. long, glandular-ciliate; flowers solitary, terminating the simple stems, or in few-flowered cymes; sepals 2.5–3.5 mm. long, ovate-lanceolate, scarious-margined, acute; petals oblong-lanceolate, 3–4 mm. long.

Dry alpine ridges, Boreal Zones; Sierra Nevada, California, to Utah. Type locality: "at timber-line on a divide northwest of Whitney Meadows, Sierra Nevada, Tulare County, California." July–Aug.

18. *Arenaria macradenia* S. Wats. Mojave Sandwort. Fig. 1698.

Arenaria macradenia S. Wats. Proc. Amer. Acad. 17: 367. 1882.

Arenaria congesta var. *macradenia* M. E. Jones, Proc. Calif. Acad. II. 5: 626. 1895.

Caudex well branched, the branches woody, stout, mostly prostrate or decumbent, 10–25 cm. long, mostly devoid of short sterile leafy stems; flowering stems 2–4 dm. high, glabrous, bearing many pairs of leaves, usually enlarged at the nodes. Leaves rather stout, subulate, 2–5 cm. long, ascending, or somewhat recurved-spreading, rigid and pungent, scabrous-ciliate on the margins; inflorescence an open cyme with few ascending branches, glabrous; sepals ovate-lanceolate, 5–6 mm. long, firm, green, with rather narrow scarious margins, sharply short-acuminate; petals oblong, well exserted; staminal glands well developed.

Dry mountain slopes, Arid Transition and Upper Sonoran Zones; southern Sierra Nevada, and the desert slopes of Los Angeles and San Bernardino Counties, California. Type locality: near the Mojave River. May–July.

Arenaria macradenia var. *Parishiörum* Robinson, Proc. Amer. Acad. 29: 296. 1894. Leaves chiefly basal; flowering stems with more elongated internodes, glabrous or sometimes glandular; petals distinctly shorter than the sepals; staminal glands larger. Desert slopes of the San Bernardino Mountains and the Providence Mountains, California. Type locality: desert slopes of the San Bernardino Mountains.

Arenaria macradenia subsp. *Ferrisiae* Abrams. Inflorescence cymosely branched, the branches and pedicels very slender, spreading, almost divaricate, sparsely glandular-puberulent or glabrous; sepals 3.5–4 mm. long, the petals about a third longer.

Inflorescentia cymosa; rami et pedicelli graciles, patuli fere divaricati, sparsim glandulo-puberulentes vel glabri; sepala 3.5–4 mm. longa, petala paulo longiora.

Southern Sierra Nevada, mainly on the eastern slopes, Kern and Inyo Counties, California. Type, trail to Big Pine Lakes, along north fork of Big Pine Creek, elevation 9,000–9,500 feet, Inyo County, *Roxana S. Ferris* 9,000 (no. 230580 Dudley Herbarium).

19. *Arenaria Bürkei* Howell. Burke's Sandwort. Fig. 1699.

Arenaria Fendleri var. *subcongesta* S. Wats. Bot. King Expl. 40. 1871.

Arenaria congesta var. *subcongesta* S. Wats. Bot. Calif. 1: 69. 1876.

Arenaria Bürkei Howell, Fl. N.W. Amer. 1: 85. 1897.

Arenaria glabrescens Piper, Contr. U.S. Nat. Herb. 11: 261. 1916.

Plants cespitose with a woody caudex; flowering stems 10–15 cm. high, glabrous or usually

glandular above. Leaves mostly basal on short sterile branches, filiform-subulate, 15–30 cm. long, pungent, glabrous; flowers mostly subsessile, in small glomerules at the ends of the branches; sepals ovate, acute or acuminate, 4 mm. long, broadly scarious-margined; petals about 5 mm. long; capsule 5–6 mm. long.

On dry rocky ridges, mainly Arid Transition Zone; British Columbia south (east of the Cascade Mountains) to Washington, Oregon, and Nevada, east to Colorado. Type locality: not definitely stated. July–Aug.

20. *Arenaria congesta* Nutt. Capitata Sandwort. Fig. 1700.

Arenaria congesta Nutt. in Torr. & Gray, Fl. N. Amer. 1: 178. 1838.

Arenaria cephaloides Rydb. Bull. Torrey Club 39: 316. 1912.

Perennial with a short, much branched woody caudex, the flowering stems simple, bearing 2–3 pairs of leaves, 1–3 dm. high, glabrous. Basal leaves filiform-subulate, 1–5 cm. long, ascending, glabrous, pungent; flowers congested into a terminal many-flowered head, sometimes with 1 or 2 smaller heads terminating short erect lateral branches; bracts scarious; sepals ovate, 4 mm. long, midvein evident, the rest unusually scarious; petals exserted; stamens well exserted.

Dry rocky and grassy slopes, mainly Arid Transition Zone; eastern Washington south to central California and east to Montana and Colorado. Type locality: "Shady hills in the Rocky Mountain range, about Bear River of the Lake of Timpanagos." June–Aug.

Arenaria congesta var. *suffrutescens* (A. Gray) Robinson, Syn. Fl. N. Amer. 1: 241. 1897. (*Brewerina suffrutescens* A. Gray, Proc. Amer. Acad. 8: 620. 1873. *Arenaria suffrutescens* Heller, Muhlenbergia 6: 96. 1910.) Inflorescence umbel-like, glabrous, the pedicels 5–15 mm. long, arising from among the congested scarious bracts; sepals mainly stramineous, thin, ovate-lanceolate, acute, 3 mm. long, slightly keeled; petals narrowly oblanceolate, exceeding the sepals; stamens equaling or exceeding the petals. Rocky ridges, Canadian and Arid Transition Zones; Siskiyou Mountains to the southern Sierra Nevada, California. Type locality: "Sierra Nevada above Cisco and between Donner Lake and Truckee, California."

6. MOEHRINGIA L. Sp. Pl. 359. 1753.

Low perennial or annual herbs, with glabrous or pubescent herbage. Leaves ovate to linear, soft, sessile or short-petioled. Flowers small, white, solitary on axillary pedicels or in terminal cymes. Sepals and petals 4 or 5. Stamens twice as many as the parts of the perianth. Styles commonly 3. Capsule ovoid or oblong, 3-valved, the valves at length 2-cleft. Seeds appendaged at the hilum by a broad membranous strophiole. [Name in honor of P. H. G. Moehring of Danzig.]

A genus of about 20 species, natives of the northern hemisphere. Only the following species are known to occur in North America. Type species, *Moehringia muscosa* L.

Leaves oblong or oval; sepals obtuse or acutish.

Leaves lanceolate to linear-lanceolate; sepals acuminate.

1. *M. lateriflora*.

2. *M. macrophylla*.

1. *Moehringia lateriflora* (L.) Fenzl. Blunt-leaved Moehringia or Sandwort. Fig. 1701.

Arenaria lateriflora L. Sp. Pl. 423. 1753.

Moehringia lateriflora Fenzl, Verbr. Alsin. 18. 1833.

Perennial, finely pubescent throughout, the stems erect or ascending, simple or sparingly branched, 8–25 cm. high. Leaves oval or oblong, obtuse, 10–25 mm. long, thin, the margins and veins ciliate; cymes terminal or axillary, few-flowered or the flowers sometimes solitary; sepals oblong, obtuse or acute, 2–3 mm. long; petals about twice the length of the sepals, nearly entire; flowers dimorphic, one form with stamens well exceeding the sepals, the other with filaments shorter and anthers mostly imperfect; ovary 3-celled below; capsule ovoid, about twice the length of the sepals, dehiscent by 3 2-cleft valves.

Moist shady places, Transition and Boreal Zones; Alaska to western and northeastern Oregon, east to Newfoundland, New Mexico, Missouri, and New Jersey; also in Eurasia. Type locality: Siberia. May–Aug.

2. *Moehringia macrophylla* Hook. Large-leaved Moehringia or Sandwort. Fig. 1702.

Arenaria macrophylla Hook. Fl. Bor. Amer. 1: 102. pl. 37. 1830.

Moehringia macrophylla Torr. Bot. Wilkes Exp. 246. 1874.

Perennial, the stems usually branched, decumbent, 10–30 cm. long, puberulent. Leaves lanceolate, acute or acuminate, narrowed at base, 2–8 cm. long; cymes terminal or in the upper axils, few-flowered or flowers solitary; sepals 3–4 mm. long, lanceolate or ovate-lanceolate, acuminate; flowers dimorphic, the staminate with the petals and stamens well exceeding the sepals, the pistillate with them shorter; capsule ovoid, shorter than the sepals, dehiscent by 3 2-cleft valves.

Moist shaded places, Transition and Boreal Zones; British Columbia to southern California, east to Labrador, Vermont, and New Mexico. Type locality: "North-West America in shady woods." Collected by Douglas. April–July.

7. HONKENYA Ehrh. Beitr. 2: 180. 1788.

[*Ammodenia* J. G. Gmelin, Fl. Sib. 4: 160, hyponym. 1769.]

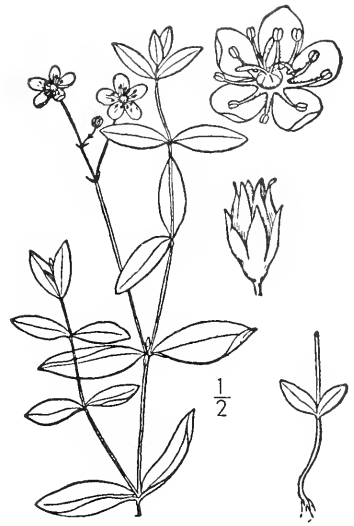
Fleshy perennial maritime herbs, with thick, clasping, ovate to lanceolate leaves. Flowers small, solitary in the axils and in the forks of the branches. Sepals and petals 5, rarely 4, the latter entire. Disk prominent, 8–10-lobed, glandular. Stamens twice as many



1699



1700



1701



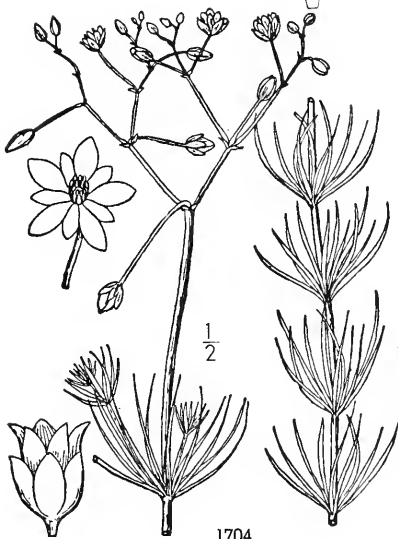
1702



1703



1705



1704



1706



1707

1699. *Arenaria Burkei*
 1700. *Arenaria congesta*
 1701. *Moehringia lateriflora*

1702. *Moehringia macrophylla*
 1703. *Honkenya peploides*
 1704. *Spergula arvensis*

1705. *Spergularia platensis*
 1706. *Spergularia Bocconei*
 1707. *Spergularia canadensis*

as petals. Capsule subglobose, fleshy, dehiscent by 3–5 entire valves. Seeds obovoid, not strophiolate. [Name in honor of Gerhart August Honkeny, German botanist of the 18th century.]

A single polymorphic species of the arctic and cool north temperate regions. Type species, *Honkenya peploides* (L.) Ehrh.

1. *Honkenya peploides* var. *major* Hook. Sea-beach Sandwort. Fig. 1703.

Arenaria peploides var. *major* Hook. Fl. Bor. Amer. 1: 102. 1830.

Arenaria oblongifolia Torr. & Gray, Fl. N. Amer. 1: 176. 1838.

Honkenya sitchensis D. Dietr. Syn. Pl. 2: 1565. 1839–52.

Ammodenia peploides subsp. *major* Piper, Contr. U.S. Nat. Herb. 11: 260. 1906.

Ammodenia major Heller, Cat. N. Amer. Pl. 4. 1898.

Minuartia peploides subsp. *major* Mattf. Bot. Jahrb. 57. Beibl. 126: 27. 1921.

Plants very fleshy, light green and glabrous, 1–3 dm. high. Leaves ovate to obovate or oblong-ovate, 15–25 mm. long; flowers solitary in the axils, subsessile on stout pedicels; sepals ovate to ovate-lanceolate, 4–6 mm. long; petals entire, slightly exceeding the sepals; capsule globose, exceeding the sepals; seeds smooth.

Seashore, Boreal Zones; this variety inhabits the Pacific shores from southern Alaska to Oregon. Type locality: "De Fuca's Straits." May–July. The typical species is known only from the arctic regions.

8. SPÉRGULA L. Sp. Pl. 440. 1753.

Annual herbs, with subulate stipulate leaves, much fascicled in the axils. Flowers white, in terminal cymes. Sepals and petals 5, the latter entire. Stamens 5 or 10. Styles 3, alternate with the sepals. Capsule dehiscent by 5 valves, opposite the sepals; seeds compressed, acutely margined or winged. [Name Latin, meaning to scatter.]

An Old World genus of two or three species. Type species, *Spergula arvensis* L.

1. *Spergula arvensis* L. Spurry. Fig. 1704.

Spergula arvensis L. Sp. Pl. 440. 1753.

Spergula ramosissima Dougl. ex Torr. & Gray, Fl. N. Amer. 1: 174. 1838.

Stems slender, erect or ascending, branching from the base, 15–45 cm. high, glabrous or more or less glandular-pubescent. Leaves narrowly linear or subulate, slightly fleshy, 2–5 cm. long, in whorl-like fascicles at the nodes; stipules minute, connate; flowers in loose terminal paniculate cymes; pedicels slender, often reflexed in fruit; sepals ovate, 3–4 mm. long; petals equaling or slightly exceeding the sepals; stamens 10 or sometimes only 5; capsule ovoid, slightly exceeding the sepals; seeds roughened, acutely angled.

A widespread weed; common in cultivated grounds in the Pacific States. Native of Europe. April–Aug.

9. SPERGULARIA Pers. Syn. Pl. 1: 504. 1805.

Low branching annual or perennial herbs, with linear, fleshy or setaceous leaves, and scarious stipules. Flowers pink or whitish, in terminal, racemose, bracted or leafy cymes. Sepals 5. Petals of the same number, fewer or sometimes wanting, entire. Stamens 2–10. Ovary 1-celled, many-ovuled; styles 3. Capsule 3-valved to the base. Seeds reniform-globose or compressed, smooth or roughened, often finely sculptured, sometimes winged. [Name a derivative of *Spergula*.]

About 40 species mostly inhabiting saline soils, and of wide geographic distribution. Type species, *Spergularia rubra* (L.) Pers.

Leaves not fascicled or occasionally some of the nodes with one or two axillary leaves; stipules deltoid, scarcely acuminate.

Seeds brown; branches of the inflorescence not divaricate.

Seeds minute, 0.4–0.5 mm. long.

Plants glabrous; cyme open; stamens 5.

Plants at least the inflorescence glandular-pubescent; cyme densely flowered; stamens 6–10.

Seeds 0.6–1.4 mm. long.

Stamens 2–5.

Seeds 0.9–1.4 mm. long, not papillose, often with an erose whitish wing.

Seeds 0.6–0.8 mm. long, papillose and without wings.

Stamens 9–10; seeds smooth, usually winged.

Seeds black.

Capsule equal to 0.5 mm. longer than the sepals; seeds pyriform, 0.4–0.5 mm. long, not iridescent.

Capsule 0.6–1.4 mm. longer than the sepals; seeds rounded, 0.6–0.8 mm. long, often iridescent.

Leaves densely fascicled; stipules lanceolate-acuminate.

Annuals; seeds not winged, distinctly reticulate.

Perennials; seeds smooth, commonly winged.

Seeds black, usually papillate; capsule slender, 4–6 mm. long.

Seeds brown, never papillate; capsule ovoid, 6–9 mm. long.

1. *S. platensis*.

2. *S. Bocconeii*.

3. *S. canadensis occidentalis*.

4. *S. marina*.

5. *S. media*.

6. *S. diandra*.

7. *S. atrosperma*.

8. *S. rubra*.

9. *S. villosa*.

10. *S. macrotheca*.

1. *Spergularia platensis* (Camb.) Fenzl. La Plata Sand Spurry. Fig. 1705.

Balardia platensis Camb. in St. Hil. Fl. Bras. Merid. 2: 181. pl. 111. 1829.

Spergularia platensis Fenzl, Ann. Wien. Mus. 2: 272. 1839.

Lepigonum gracile S. Wats. Proc. Amer. Acad. 17: 367. 1882.

Tissa gracilis Britt. Bull. Torrey Club 16: 128. 1889.

Annual, diffusely branched forming depressed mats, 2–3 dm. across, glabrous and not at all fleshy, the ultimate branches almost filiform. Leaves narrowly linear, flat, 1–2 cm. long, scarcely 1 mm. wide; stipules small, 1–3 mm. long; flowers numerous, in open cymes; pedicels filiform, 2–8 mm. long; sepals scarcely 2 mm. long; petals minute or rarely none; stamens 2; capsule 1.5–2.5 mm. long; seeds brown, minute, strongly rough-tuberculate.

Desiccated vernal pools, Sonoran Zones; southern California and Texas; also southern Brazil from whence it is probably introduced. March–June.

2. *Spergularia Bocconeï* (Scheele) Foucaud. Boccone's Sand Spurry. Fig. 1706.

Alsine Bocconeï Scheele, Flora 26: 431. 1843.

Tissa luteola Greene, Pittonia 5: 114. 1903.

Spergularia Bocconeï Foucaud ex Merino, Mem. Soc. Esp. Hist. Nat. 2: 496. 1904.

Alsine luteola House, Amer. Midl. Nat. 7: 134. 1921.

Annual, much branched from the base forming mats 8–20 cm. broad, often yellowish green, glabrous except for glandular hairs on the pedicels and sepals, or glandular-villous throughout. Leaves linear, subterete, 1–2 cm. long, pungently acute; stipules deltoid, acuminate, 2–3 mm. long; flowers numerous, densely cymose, short-pedicelled; sepals with broad scarious margins, 2–3 mm. long; petals about equaling the sepals, white or tinged with rose; stamens 6–10; seeds minute, 0.4–0.5 mm. long, brown, wingless, glandular-papillate.

Along beaten paths and in saline soils, probably introduced from southern Europe; Portland, Oregon, and central to southern California. April–Sept.

3. *Spergularia canadensis* var. *occidentalis* R. P. Rossb. Canadian Sand Spurry. Fig. 1707.

Spergularia canadensis var. *occidentalis* R. P. Rossb. Rhodora 42: 116. 1940.

Annual, stems erect or ascending, sparsely glandular-villous or glabrous. Leaves linear, fleshy, blunt-tipped not mucronate, 1–4 cm. long; stipules triangular; inflorescence open, leafy; sepals 3–4.5 mm. long, glabrous or glandular-villous; petals white or pink; stamens 2–5; fruiting pedicel reflexed, 4–15 mm. long; capsule 4.5–6.5 mm. long; seeds brown, dull, 0.9–1.4 mm. long, usually smooth on the sides, often glandular-pubescent especially at the summit, and often with a whitish erose wing.

Salt marshes along the coast, mainly Boreal Zones; Vancouver Island, British Columbia, to Humboldt Bay, California. Type locality: brackish clay near mouth of Palix River, Pacific County, Washington. June–Aug.

4. *Spergularia marina* (L.) Griseb. Salt-marsh Sand Spurry. Fig. 1708.

Arenaria rubra var. *marina* L. Sp. Pl. 423. 1753.

Arenaria marina All. Fl. Ped. 2: 114. 1785.

Spergularia salina J. & C. Presl, Fl. Cech. 95. 1819.

Buda marina Dumort. Fl. Belg. 110. 1827.

Spergularia marina Griseb. Spicil. Fl. Rumel. 1: 213. 1843.

Tissa marina Britt. Bull. Torrey Club 16: 126. 1889.

Annual, fleshy and more or less glandular-pubescent, the stems erect or ascending, 1–3 dm. long. Leaves fleshy, rarely slightly fascicled, linear, 2–4 cm. long; stipules ovate-deltoid, scarious, 2–4 mm. long; flowers in terminal leafy cymose racemes; sepals ovate to ovate-lanceolate, 3–5 mm. long; petals pink, nearly as long as the sepals; stamens 2–5; capsule equaling or slightly exceeding the sepals; seeds obovoid, glandular-papillose or rarely almost smooth.

Sea beaches, borders of salt marshes, and alkaline plains; Washington to southern California, also on the Atlantic coast and in the interior; Eurasia. March–Sept.

5. *Spergularia media* (L.) Presl. Middle-sized Sand Spurry. Fig. 1709.

Arenaria media L. Sp. Pl. ed. 2. 606. 1762.

Spergularia media Presl, Fl. Sic. 1: 161. 1826.

Annual or perennial with one to many ascending or decumbent stems, glabrous or the upper internodes sparingly glandular-pubescent. Leaves 1–5 cm. long, 1–2 mm. wide, with 1–3 smaller ones in the axils or not at all fascicled; stipules deltoid, 3–6 mm. long; sepals 3–6 mm. long; petals 2.5–4.5 mm. long, white; stamens 9–10; capsule usually a little longer than the sepals; seeds smooth or faintly reticulate, commonly with a prominent scarious wing.

Sparingly introduced in the Pacific States; tide flats at Toledo and ballast at Linton, Oregon; also Marin County, California; native of Europe. May–July.

6. *Spergularia diandra* (Guss.) Boiss. Mediterranean Sand Spurry. Fig. 1710.

Arenaria diandra Guss. Prodr. Sic. 1: 515. 1827.

Spergularia diandra Boiss. Fl. Orien. 1: 733. 1867.

Spergularia salsuginea var. *bracteata* Robinson, Syn. Fl. N. Amer. 1: 251. 1897.

Tissa bracteata Small, Fl. S.E. U.S. 418, 1330. 1903.

Spergularia bracteata A. Nels. & Macbr. Bot. Gaz. 61: 30. 1916.

Low depressed annual, the stems divaricately branched, glandular-pubescent. Leaves flat but rather thick, narrowly linear, 5–15 mm. long; stipules small; flowers in open leafy-bracted cymes; pedicels slender, 5–10 mm. long; sepals 3–4 mm. long; petals 5, rose-colored, scarcely equaling the sepals; stamens 4–7; capsule 3–4 mm. long; seeds black, faintly reticulate, not winged.

Sandy or gravelly bars, Upper Sonoran Zones; Columbia River Basin, Washington and Idaho, to the Sacramento and San Joaquin Valleys, California. Type locality: in Europe. April–Nov.

7. *Spergularia atropérma* R. P. Rosseb. Black-seeded Spurry. Fig. 1711.

Spergularia atropserma R. P. Rosseb. Rhodora 42: 80. 1940.

Annual, branching from the base, the branches few to several, erect or spreading, 5–18 cm. long, glabrous or glandular-villous. Leaves linear, not fascicled, 10–25 mm. long, narrowly linear; stipules broadly triangular, acuminate; cymes with filiform internodes; sepals ovate-lanceolate, 3–4 mm. long; petals ovate, 2–2.5 mm. long; stamens 4–8; capsules 3–5 mm. long; seeds black, finely areolate, 0.6–0.8 mm. long, iridescent.

Alkaline soils, Sonoran and Transition Zones; Sacramento Valley to southern California, and Carson Valley, Nevada. Type locality: Los Baños Hills, Merced County, California. April–July.

8. *Spergularia rubra* (L.) Presl. Purple Sand Spurry. Fig. 1712.

Arenaria rubra L. Sp. Pl. 423. 1753.

Tissa rubra Britt. Bull. Torrey Club 16: 127. 1889.

Spergularia rubra Presl, Fl. Cech. 94. 1819.

Buda rubra Dumort. Fl. Belg. 110. 1827.

Annual or perennial, prostrate or decumbent, forming dense mats, the stems slender, 6–25 cm. long, glandular above. Leaves linear, 6–12 mm. long, cuspidate, densely fascicled; stipules attenuate-lanceolate, 4–5 mm. long, conspicuously silvery; cymes small, pedicels slender, exceeding the foliaceous bracts; sepals oblong-lanceolate, acute, 3–4 mm. long; petals reddish, about as long as the sepals; stamens 6–10; capsule acute, equaling or exceeding the sepals; seeds dark brown, rounded, minutely papillate, especially on the edges, 0.4–0.6 mm. long.

Waste places and roadsides; introduced in the Pacific States, and becoming fairly common from the Puget Sound to southern California; also in the eastern states. Native of Eurasia. April–Sept.

9. *Spergularia villòsa* (Pers.) Camb. Villous Sand Spurry. Fig. 1713.

Spergula villosa Pers. Syn. Pl. 1: 522. 1805.

Tissa Clevelandii Greene, Fl. Fran. 127. 1891.

Spergularia villosa Camb. in St. Hil. Fl. Bras. Merid. 2: 178. 1892.

Spergularia Clevelandii Robinson, Proc. Amer. Acad. 29: 310. 1894.

Aisine Clevelandii House, Amer. Midl. Nat. 7: 134. 1921.

Plants perennial with a slender taproot, viscid-glandular and scarcely or not at all fleshy, the stems slender, prostrate or ascending, 1–3 dm. high, often much branched and forming mats. Leaves fascicled, filiform and nearly terete, attenuate, 1–2 cm. long, exceeding the internodes; stipules attenuate-lanceolate, 2–8 mm. long; cymes terminal; sepals oblong, acute, 3–5 mm. long; petals about as long as sepals, white; capsule slightly exceeding the sepals; seeds black, winged or sometimes some of them wingless.

Usually in sandy soil, near the coast; San Francisco Bay to northern Lower California; also South America. Type locality: Montevideo, Uruguay. April–July.

10. *Spergularia macrothèca* (Hornem.) Heynh. Large-flowered Sand Spurry. Fig. 1714.

Arenaria macrotheca Hornem. ex Cham. & Schl. Linnaea 1: 53. 1826.

Lepigonum macrothecum Fisch. & Mey. Ind. Sem. Hort. Petrop. 3: 14. 1837.

Spergularia macrotheca Heynh. Nom. 2: 689. 1840.

Tissa macrotheca var. *scariosa* Britt. Bull. Torrey Club 16: 129. 1889.

Tissa pallida Greene ex Britt. Bull. Torrey Club 16: 129. 1889.

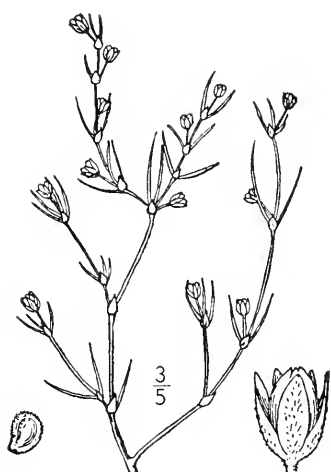
Tissa valida Greene, Erythraea 1: 106. 1893.

Perennial from a stout fleshy root, more or less glandular-pubescent throughout, the stems stout, ascending, 1–4 dm. high, branching from the base. Leaves broadly linear, 15–40 mm. long; cymes terminal, their branches often racemose; pedicels about 15 mm. long; sepals 5–10 mm. long, broadly scarious-margined; petals rose-colored, equaling the sepals; capsule shorter than or equaling the sepals; seeds dark brown, winged or not, the sides smooth.

Saline soils, near the coast; Washington to Lower California. Type locality: California. A variable species of which the following varieties may be recognized.

Spergularia macrotheca var. *leucántha* (Greene) Robinson, Proc. Amer. Acad. 29: 313. 1894. (*Tissa leucantha* Greene, Pittonia 1: 301. 1899. *Tissa leucantha* var. *glabra* Davidson, Bull. S. Calif. Acad. 25: 84. 1926.) Glabrous throughout, or sparsely glandular-pubescent above; flowers white; capsule exceeding the sepals. This variety grows in alkaline soils of the interior valleys of central and southern California.

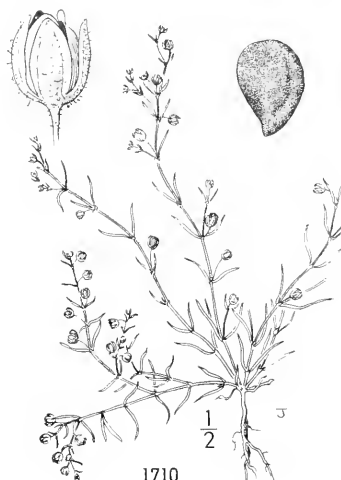
Spergularia macrotheca var. *longistyla* R. P. Rosseb. Rhodora 42: 78. 1940. Petals white; styles divided to the base, 2–3 mm. long; capsule 5–6 mm. long. Alkaline soils, Upper Sonoran Zone; Inner Coast Ranges from Napa County to Alameda County, California.



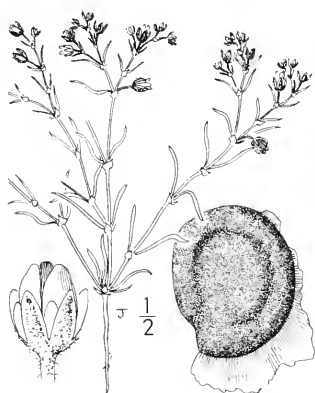
1708



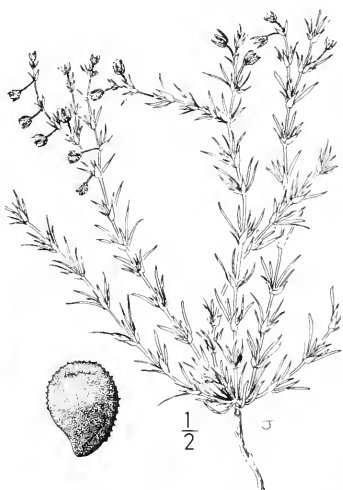
1709



1710



1711



1712



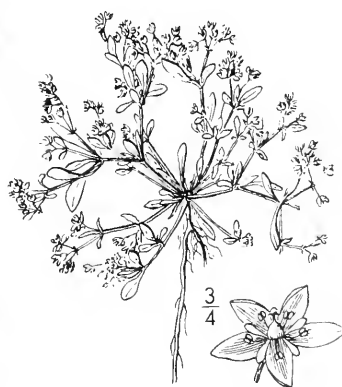
1713



1714



1715



1716

1708. *Spergularia marina*
 1709. *Spergularia media*
 1710. *Spergularia diandra*

1711. *Spergularia atrosperma*
 1712. *Spergularia rubra*
 1713. *Spergularia villosa*

1714. *Spergularia macrotheca*
 1715. *Polycarpon tetraphyllum*
 1716. *Polycarpon depressum*

10. **POLYCARPON** L. Syst. Nat. ed. 10. 881. 1759.

Low diffusely branching annuals, with flat leaves, scarious stipules and bracts. Flowers numerous, small, cymose. Sepals 5, scarious-margined, more or less carinate. Petals 5, entire or emarginate, smaller than the sepals. Stamens 3-5. Styles simple, short, 3-cleft. Capsule 3-valved; seeds ovoid, embryo only slightly curved. [Name Greek, meaning many fruits.]

About 6 species, of wide distribution in temperate and tropical regions. Type species, *Polycarpon tetraphyllum* L.

Sepals 2 mm. long, strongly keeled; leaves often appearing as if in 4's.
 Sepals 1 mm. long, only slightly if at all carinate; leaves opposite.

1. *P. tetraphyllum*.
 2. *P. depressum*.

1. **Polycarpon tetraphyllum** L. Four-leaved Polycarp. Fig. 1715.

Polycarpon tetraphyllum L. Sys. Nat. ed. 10. 881. 1759.

Stems much branched from the base, ascending or prostrate, 8-12 cm. long, glabrous. Leaves opposite or often in 4's, oblong to obovate, 4-12 mm. long, rather abruptly narrowed to a short petiole; stipules and bracts lanceolate-acuminate; sepals about 2 mm. long, the prominent keel obscurely serrulate; petals very thin, oblanceolate; capsule ovoid.

Along beaten paths, naturalized from Europe; sparingly introduced in central and southern California. May-July.

2. **Polycarpon depréssum** Nutt. California Polycarp. Fig. 1716.

Polycarpon depressum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 173. 1838.

A diminutive glabrous annual, diffusely branched from the base, the branches 1-4 cm. long. Leaves opposite, spatulate, 4-8 mm. long, attenuate to a slender petiole; bracts less than 1 mm. long; sepals 1 mm. long, inconspicuously carinate; petals narrowly linear, membranous; capsule spherical.

Dry sandy soils, Upper Sonoran Zone; Monterey County, California, to northern Lower California. Type locality: on bare sand hills near San Diego, California. April-June.

11. **LOEFLINGIA** L. Sp. Pl. 35. 1753.

Low, diffusely branched, glandular-pubescent annuals, with subulate leaves. Flowers small, greenish, sessile or solitary or fascicled flowers. Sepals 5, narrow, attenuate into a rather rigid setaceous tip, straight or recurved, entire or the three outer with a setaceous tooth on either margin. Petals 3-5, minute or wanting. Stamens 3-5. Style very short or none; stigmas 3; ovary triangular. Capsule 3-valved; seeds several, oblong. [Name in honor of Peter Loeffling, a Swedish naturalist of the 18th century.]

Five species in the Mediterranean region, central Asia and western North America. Type species, *Loeflingia hispanica* L.

Sepals more or less recurved, the three outer with a setaceous tooth on each side.
 Sepals straight or nearly so, all entire.

1. *L. squarrosa*.
 2. *L. pusilla*

1. **Loeflingia squarrosa** Nutt. California Loeflingia. Fig. 1717.

Loeflingia squarrosa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 174. 1838.

Low annual, glandular-pubescent throughout, the stems much branched, prostrate or ascending, 5-15 cm. long. Leaves subulate-setaceous, 4-6 mm. long, rather rigid and recurved; sepals similar to the leaves but a little shorter, recurved and bristle-tipped, carinate; petals minute; stamens 3-5; capsule slender, triquetrous, nearly equaling the sepals; seeds many.

Dry soils, Sonoran Zones; Sacramento Valley, California, to the cismontane region of southern California and northern Lower California. Type locality: sandy plains, San Diego, California. April-May.

2. **Loeflingia pusilla** Curran. Dwarf Loeflingia. Fig. 1718.

Loeflingia pusilla Curran, Bull. Calif. Acad. 1: 152. 1885.

Glandular-pubescent annual, the stems much branched, prostrate or ascending, 4-6 cm. long. Leaves subulate, 4-6 mm. long; sepals narrowly lanceolate, abruptly acute and bristle-tipped, not squarrose nor rigid, all entire; petals none; stamens 5; styles none; capsule narrowly triquetrous, early equaling the sepals; seeds many.

Upper Sonoran Zone; known only from the Tehachapi Mountains, California, where it was originally collected at an elevation of 4,000 feet. April-May.

12. **AGRÓSTEMMA** L. Sp. Pl. 435. 1753.

Annual or perennial herbs, with linear or linear-lanceolate leaves and large showy flowers at the ends of axillary peduncles. Calyx 5-lobed, the tube 10-ribbed, narrowed at the throat, the lobes linear, foliaceous. Petals 5, their blades obovate or cuneate, emarginate, not appendaged. Stamens 10. Styles 5. Capsule 1-celled; seeds numerous, black. [Name Greek, meaning a field garland.]

Two species, natives of Eurasia. Type species, *Agrostemma Githago* L.

1. *Agrostemma Githago* L. Corn Cockle. Fig. 1719.*Agrostemma Githago* L. Sp. Pl. 435. 1753.

Stems erect, 3–10 dm. high, simple or with a few erect branches, densely pubescent throughout with appressed whitish hairs. Leaves linear-lanceolate, acute to long-acuminate, 5–10 cm. long; flowers solitary and terminal on the stout elongated peduncles; calyx-tube ovoid, 10–15 mm. long, the lobes 2–3 times as long; petals purple, varying to white or red, a little shorter than the calyx-lobes.

Grainfields and waste places, adventive from Europe, and fairly well established in Oregon, less so in Washington and California. May–July.

13. *SILÈNE* L. Sp. Pl. 416. 1753.

Annual or perennial herbs with clustered or solitary stems, opposite exstipulate leaves, and white, pink, or red usually cymose flowers. Calyx cylindric, ovoid or campanulate, 5-toothed or -cleft, 10-to-many-nerved. Petals 5, clawed, the blades often cleft or toothed, usually with a scale-like appendage at the base, the claws sometimes with auricles. Stamens 10. Styles 3, rarely 4 or 5; ovary 1-celled or incompletely 2–4-celled. Fruit a capsule, dehiscent by 6 or rarely 3 apical teeth. Seeds numerous, often papillate or tubercled. [Name Greek, meaning saliva, in allusion to the viscid herbage of many species.]

A genus of wide geographic distribution, comprising about 250 species. Type species, *Silene anglica* L.

Calyx with 15 or more nerves.

Nerves of the calyx 18–23, prominent; annual.

1. *S. multinervia*.

Nerves of the calyx 15–20, obscure; perennial.

2. *S. latifolia*.

Calyx with 10 nerves.

Annuals.

Flowers cymose or paniculate.

Plants glabrous except for a glutinous band near middle of upper internodes.

3. *S. antirrhina*.

Plants glandular-pubescent throughout.

4. *S. noctiflora*.

Flowers in a simple one-sided raceme.

5. *S. gallica*.

Perennials.

Plants acaulescent and densely matted, moss-like.

6. *S. acaulis*.

Plants caulescent.

Flowers large; petals 2.5 cm. or more long, or if shorter calyx at least 2 cm. long.

Corolla well exserted.

Petals bright red.

Plants 6–15 dm. high; capsule oblong, exserted.

7. *S. laciniata*.

Plants 1.5–3 dm. high; capsule ovoid, included.

8. *S. californica*.

Petals white or pink.

9. *S. Hookeri*.

Corolla little exceeding calyx, white.

10. *S. Parishii*.

Flowers smaller; petals seldom over 2 cm. long and calyx under 2 cm. (except *occidentalis*).

Flowers solitary in the forks of leafy branches or terminal.

Calyx broadly campanulate, 10–12 mm. long.

11. *S. campanulata*.

Calyx cylindric, 5–7 mm. long.

Leaves obovate to oblanceolate, up to 8 cm. long, puberulent but not glandular; petals white.

12. *S. Menziesii*.

Leaves ovate or lanceolate, 2 cm. or less in length, glandular-puberulent; petals purple.

13. *S. Seelyi*.

Flowers in terminal panicles, rarely solitary.

Flowers nodding in anthesis; stamens and style long-exserted.

Petals 4-cleft.

14. *S. Lemmonii*.

Petals 2-cleft.

15. *S. Bridgesii*.

Flowers erect or nearly so; stamens little exserted or included.

Calyx deeply cleft, the teeth lanceolate, nearly equaling the tube.

Petals 2-lobed with a broad sinus; appendages present.

16. *S. pectinata*.

Petals shallowly 4-lobed; appendages absent.

17. *S. aperta*.

Calyx merely toothed, the teeth 2–4 mm. long.

Petals 4-cleft, in *bernardina* 2-cleft with the lobes again cleft to the middle.

Auricles on claws absent.

18. *S. occidentalis*.

Auricles present.

Leaves narrowly linear to narrowly oblanceolate; those of the stem remote and reduced.

Claws of petals woolly.

19. *S. bernardina*.

Claws of petals glabrous.

Appendages of petals 2-cleft into linear entire segments.

20. *S. oregonica*.

Appendages fimbriate or toothed.

21. *S. montana*.

Leaves ovate to lanceolate, those of the stem well developed; coastal species.

Plants densely short-tomentose; leaves ovate; calyx-teeth rounded.

22. *S. grandis*.

Plants puberulent; leaves lanceolate; calyx-teeth acute.

23. *S. pacifica*.

Petals 2-cleft, with or without a lateral tooth on outer side of each segment.

Plants not caespitose.

Stems few (1-4), arising from a taproot.

Flowers in a verticillate spicate raceme; auricles not saccate.

24. *S. Scouleri*.

Flowers in a narrow panicle; auricles somewhat saccate.

25. *S. scapoza*.

Stems many from the branching crown of taproot.

Calyx cylindric, becoming constricted about the stipe below the capsule.

Plants densely glandular-pubescent; claws glabrous; seeds papillate on the sides.

26. *S. verecunda*.

Plants puberulent; claws villous at base; seeds tessellate on the sides.

27. *S. platyota*.

Calyx oblong to campanulate, not constricted about the stipe below the capsule.

Segments of the petal blades entire.

28. *S. Douglasii*.

Segments with a linear lateral tooth on the outer edge of each.

29. *S. Macounii*.

Plants caespitose.

Capsule sessile, or nearly so; leaves somewhat fleshy.

30. *S. Grayi*.

Capsule on a stipe 2-3 mm. long.

Petals with lateral teeth present; appendages quadrate.

31. *S. Watsonii*.

Petals without lateral teeth; appendages obtuse to retuse.

32. *S. Suksdorfii*.

1. *Silene multinervia* S. Wats. Many-nerved Catchfly. Fig. 1720.

Silene multinervia S. Wats. Proc. Amer. Acad. 25: 126. 1890.

Annual, pubescent throughout and somewhat viscid-glandular above, the stems erect, mostly simple, 2-4 dm. high. Leaves narrowly oblong or linear, acute; inflorescence cymose, with unequal branches; calyx ovoid in fruit, contracted above, 10 mm. long, 18-23-ribbed; petals small, not exceeding the subulate calyx-teeth, purplish, unappendaged; capsule narrowly ovoid.

Open slopes and burns, Upper Sonoran and Transition Zones; California Coast Ranges, Marin County to San Diego County, also Santa Cruz Island; sparingly introduced in western Washington and Oregon. Type locality: Jamul, San Diego County, California. April.

2. *Silene latifolia* (Mill.) Britten & Rendle. Bladder Campion. Fig. 1721.

Cucubalus Behen L. Sp. Pl. 414. 1753. Not *Silene Behen* L.

Cucubalus latifolius Mill. Gard. Dict. ed. 8. no. 2. 1768.

Behen vulgaris Moench, Meth. 709. 1794.

Silene Cucubalus Wibel, Prim. Fl. Werth. 241. 1799.

Silene inflata J. E. Smith, Fl. Brit. 2: 292. 1800.

Silene latifolia Britten & Rendle, List Brit. Seed-Plants 5. 1907.

Perennial, glaucous and glabrous, or rarely slightly pubescent, the stems spreading or ascending, 2-4 dm. long. Leaves ovate to lanceolate, acute, uppermost reduced to bracts, sessile; inflorescence a loose cymose panicle; calyx campanulate, becoming inflated and globose, 15 mm. high, 15-20-nerved, with connecting veinlets; petals white or pink, 2-cleft, with or without small appendages.

Sparingly introduced in the Pacific States from Washington to southern California. Native of Europe. June-July.

3. *Silene antirrhina* L. Sleepy or Snapdragon Catchfly. Fig. 1722.

Silene antirrhina L. Sp. Pl. 419. 1753.

Silene dioica Cham. & Sch. Linnaea 1: 38. 1826.

Annual, glabrous except for a viscid belt near the middle of upper internodes, the stems erect, simple or sparingly branched. Leaves 2-3 cm. long, oblong-lanceolate or linear, usually acute; inflorescence paniculate; pedicels filiform, 10-35 mm. long; calyx 8 mm. long, bright green, ovoid in fruit; petals small, pink or white, emarginate or bifid; ovary nearly sessile.

Sandy or gravelly soils, Upper Sonoran and Transition Zones; British Columbia to southern California, and widely distributed across the continent. Type locality: Virginia. May-Aug.

4. *Silene noctiflora* L. Night-flowering Catchfly. Fig. 1723.

Silene noctiflora L. Sp. Pl. 419. 1753.

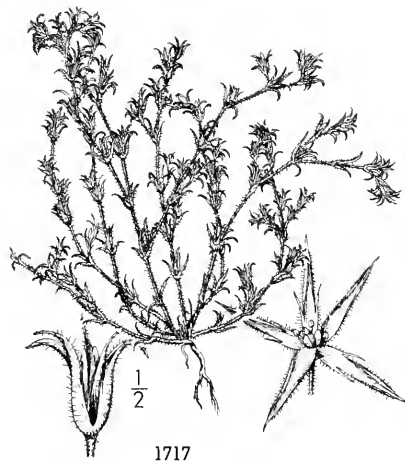
Annual, viscid-pubescent, the stems erect, stout, simple or branching, 3-7 dm. high. Leaves 4-12 cm. long, the lower obovate to oblanceolate, obtuse, narrowed to a broad petiole, the upper ovate-lanceolate, acute or acuminate, sessile; inflorescence a loose, few-flowered, dichotomous panicle; calyx cylindric, 12-25 mm. long, conspicuously veined, expanded in fruit, the teeth linear, acute; petals white or pink, 2-cleft, appendages denticulate.

Waste places and grainfields, introduced from Europe; sparingly established in Washington and Oregon on both sides of the Cascades. June-Sept.

5. *Silene gállica* L. Common Catchfly. Fig. 1724.

Silene anglica L. Sp. Pl. 416. 1753.

Silene gallica L. Sp. Pl. 417. 1753.



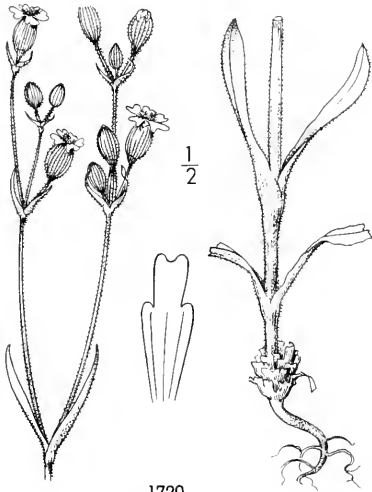
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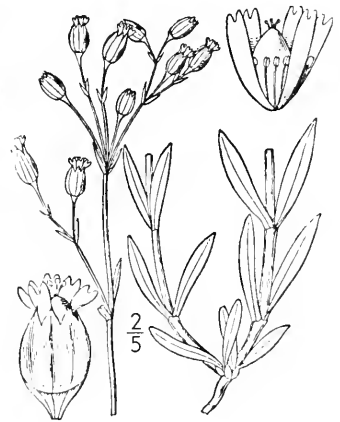
1719



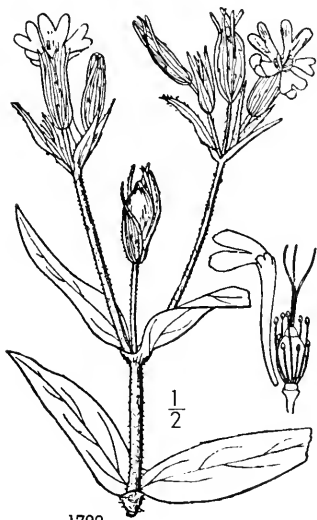
1720



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1723



1724



1725

1717. *Loeeflingia squarrosa*
 1718. *Loeeflingia pusilla*
 1719. *Agrostemma Githago*

1720. *Silene multinervia*
 1721. *Silene latifolia*
 1722. *Silene antirrhina*

1723. *Silene noctiflora*
 1724. *Silene gallica*
 1725. *Silene acaulis*

Annual, hirsute with spreading jointed hairs, the stems erect, simple or branching, 1–5 dm. high. Leaves spatulate, obtuse and mucronate, 20–45 mm. long; inflorescence a one-sided terminal raceme; pedicels short; calyx cylindric, 8–14 mm. long, becoming subglobose in fruit with a contracted throat, the teeth short, lanceolate, spreading; petals small, scarcely exceeding the calyx, tinged with pink or red, twisted one-fourth around, and more or less cohering at the base of the blades, entire or slightly emarginate, appendages minute.

Common wayside and garden weed throughout the Pacific States. Native of Europe. April–Oct.

6. *Silene acaulis* L. Moss Campion. Fig. 1725.

Cucubalus acaulis L. Sp. Pl. 415. 1753.

Silene acaulis L. Sp. Pl. ed. 2. 603. 1762.

Perennial, puberulent or glabrous, the stems cespitose and densely matted, 5–12 cm. high. Leaves crowded, linear, sessile, 5–20 mm. long, about 1 mm. wide, ciliate-serrulate; flowers solitary at the ends of the branches, sessile or on slender peduncles; calyx campanulate, 8–9 mm. long, glabrous, the teeth short and rounded; petals purple or rarely white, entire or emarginate, appendages minute.

Rock crevices, Arctic-Alpine Zone; arctic America south to Mount Rainier, Washington, to northern Arizona in the Rocky Mountains, and to Mount Washington in the eastern United States; also in arctic Eurasia. Type locality: Lapland. June–Aug.

7. *Silene laciniata* Cav. Southern or Fringed Indian Pink. Fig. 1726.

Silene laciniata Cav. Ic. 6: 44. 1801.

Lychnis pulchra Cham. & Sch. Linnaea 5: 234.

Silene speciosa Paxton, Mag. Bot. 10: 219. 1843.

Silene simulans Greene, Pittonia 1: 63. 1887.

Perennial, finely pubescent and glandular, the stems simple and erect or branching from the base and decumbent, 4–10 dm. high. Leaves lanceolate to linear-lanceolate, varying to oblanceolate or obovate, narrowed to a sessile base, 3–12 cm. long; flowers solitary or in few-flowered panicles; calyx cylindric, 15–20 mm. long, the teeth 2 mm. long, obtuse; petals crimson, well exserted, deeply 4-cleft, the lobes entire or bifid, appendages erect, denticulate; capsule oblong, exserted; seeds papillate.

Canyon slopes, Upper Sonoran Zone; San Luis Obispo County, California, to northern Lower California east to New Mexico and Mexico. Type locality: in Pachuca, Real del Monte at Acapulco. May–June.

8. *Silene californica* Durand. California Indian Pink. Fig. 1727.

Silene californica Durand, Journ. Acad. Phila. II. 3: 83. 1855.

Melandrium californicum Rohrb. Linnaea 36: 252. 1869–70.

Silene laciniata var. *californica* A. Gray, Proc. Bost. Soc. Nat. Hist. 7: 146. 1859.

Silene Tilingii Regel, Act. Hort. Petrop. 1: 99. 1871.

Perennial, puberulent and viscid-glandular, stems usually several from a stout taproot, erect or decumbent, 1.5–3 dm. high. Leaves elliptic-ovate to oblanceolate, acuminate, 3–9 cm. long; flowers solitary or in few-flowered clusters; calyx cylindric, 15–20 mm. long, distended to obovoid in fruit, the teeth lanceolate; petals crimson, much exserted, deeply 4-cleft, the middle lobes broader, the outer narrower and shorter, all varying from entire to many-toothed, appendages incurved, slightly denticulate; capsule ovoid, shorter than the calyx; seeds papillate.

Open woods, Upper Sonoran and Transition Zones; Coast Ranges from Curry County, Oregon, to Monterey County, California, and in the Sierra Nevada to the Tehachapi Mountains. Type locality: near Nevada City, Nevada County, California. May–July.

9. *Silene Hookeri* Nutt. Oregon or Hooker's Indian Pink. Fig. 1728.

Silene Hookeri Nutt. in Torr. & Gray Fl. N. Amer. 1: 193. 1838.

Melandrium Hookeri Rohrb. Linnaea 36: 253. 1869–70.

Silene Ingramii Tidestrom & Dayton, Proc. Biol. Soc. Wash. 42: 207. 1929.

Silene pulverulenta M. E. Peck, Torreya 32: 148. 1932.

Perennial, finely grayish pubescent, the stems usually several from the base, erect or decumbent, slender, 7–25 cm. high. Leaves 3–8 cm. long, oblanceolate or spatulate, acute, attenuate at base to a winged petiole; flowers terminal or solitary in the upper axils; pedicels slender, elongated; calyx cylindric-funnelform, 12–18 mm. long; petals 25–30 mm. long, white or deep rose pink, 4-lobed, the lobes usually 5–6 mm. long, entire, appendages emarginate or entire; capsule globose-ovoid, stipitate; seeds papillate.

Open woods and grassy slopes, Transition Zone; Willamette Valley, Oregon, to the Siskiyou Mountains, California. A form (*S. Ingramii*) with deep rose flowers is frequent in Douglas County, Oregon. Type locality: "Woods of the Wahlamet, Oregon." April–July.

Silene Hookeri subsp. *Bolanderi* (A. Gray) Abrams. (*Silene Bolanderi* A. Gray, Proc. Amer. Acad. 7: 330. 1868.) Flowers larger, the petals 35–40 mm. long, the limb 4–6-parted into narrowly lanceolate segments 10–15 mm. long. This subspecies grows in open woods, Humid Transition Zone; Humboldt and Mendocino Counties, California.

10. *Silene Parishii* S. Wats. Parish's Campion. Fig. 1729.

Silene Parishii S. Wats. Proc. Amer. Acad. 17: 366. 1882.

Perennial, finely grayish pubescent, the stems several from a thick taproot, slightly decumbent at base, 10–25 cm. high. Leaves lanceolate to oblanceolate, acuminate, 2–3.5 cm. long; flowers terminal or in the upper axils, in 1–4-flowered clusters; calyx broadly cylindric, yellowish, 15–20

mm. long, the teeth lanceolate, 4-5 mm. long; petals white or lemon yellow, little exerted, deeply 4-cleft, the lobes narrowly linear-lanceolate or subulate, appendages truncate, irregularly toothed; seeds crested with a double row of flattened tubercles.

Open pine forests, Arid Transition and Canadian Zones; southern California, from the San Gabriel to the San Jacinto Mountains. Type locality: San Bernardino Mountains, California. July-Sept.

11. *Silene campanulata* S. Wats. Campanulate Campion. Fig. 1730.

Silene campanulata S. Wats. Proc. Amer. Acad. 10: 341. 1875.

Perennial, glandular-puberulent, the stems several from the thick crown of the taproot, erect, 2-4 dm. high. Leaves oblanceolate, acute or acuminate, sessile, 2-3.5 cm. long; calyx broadly campanulate, 1 cm. long, the teeth broad, very obtuse, 3-4 mm. long; petals greenish white or flesh-colored, well exerted, 4-6-cleft, the segments rather deeply 2-cleft, appendages 4, the two outer narrow and entire, the inner several-toothed, auricles broad; capsule globose-ovoid, slightly exceeding the calyx.

Dry mountain slopes, Transition and Canadian Zones; Lane County, Oregon, south to Mendocino County, California. Type locality: Red Mountain, Mendocino County, California. May-July.

Silene campanulata var. *Greenei* S. Wats. Proc. Amer. Acad. 28: 137. 1893. (*S. Greenei* Howell, Fl. N.W. Amer. 76. 1897; *S. campanulata* var. *petrophila* Jepson, Fl. Calif. 504. 1914.) Very finely and usually densely pubescent, but not at all glandular or the inflorescence only scarcely so; leaves broadly ovate. Canyonville, Douglas County, Oregon, to eastern Siskiyou and Shasta Counties, California.

Silene campanulata var. *orbiculata* Robinson, Syn. Fl. N. Amer. 1: 219. 1897. Perhaps only a leaf form of the preceding variety. The leaves are suborbicular and cordate-clasping. Trinity and Shasta Counties, California.

12. *Silene Menziesii* Hook. Menzies' Campion. Fig. 1731.

Silene Menziesii Hook. Fl. Bor. Amer. 1: 90. pl. 30. 1830.

Silene stellarioides Nutt. in Torr. & Gray, Fl. N. Amer. 1: 193. 1838.

Silene Dorrisii Kellogg, Proc. Calif. Acad. 3: 33. f. 12. 1863.

Anotites Menziesii Greene, Leaflets Bot. Obs. 1: 98. 1905.

Perennial with several rootstocks arising from a taproot, glandular-pubescent, the stems several, erect, slender, dichotomously branched above, 1-3 dm. high. Leaves 2.5-5 cm. long, oblanceolate to obovate, acute or short-acuminate, tapering to the base; flowers many, on slender pedicels in the axils of the upper reduced leaves; calyx 5-7 mm. long, obovoid to oblong; petals white, narrowly fan-shaped, 2-cleft and with or without small lateral teeth, appendages minute or wanting; capsule equaling the calyx; seeds minutely papillose-scarious.

Stream banks and mountain meadows, Transition and Canadian Zones; British Columbia to Saskatchewan, southern California, New Mexico, and Missouri. Type locality: "North-West Coast of America." June-Aug.

13. *Silene Seelyi* Morton & Thompson. Seely's Campion. Fig. 1732.

Silene Seelyi Morton & Thompson, Torreya 33: 70. 1933.

Perennial, the stems many, slender, 6-20 cm. high, glandular-puberulent. Leaves sessile, ovate to lanceolate, 8-20 mm. long, glandular-puberulent and glandular-ciliolate; flowers solitary between the terminal pair of leaves or in the forks of the branches; pedicels 1-2 cm. long, slender; calyx cylindric, glandular-puberulent, the tube 5 mm. long, green, inconspicuously 10-nerved; the teeth triangular, acuminate, 2 mm. long; petals purple, 10-12 mm. long, linear-oblanceolate, bifid or rarely entire, narrowly clawed, with 2 conspicuous scales at the base of the blade; ovary short-stipitate, 6-valved.

Rock crevices, Canadian Zone; vicinity of Mount Stuart, Chelan County, Washington. Type locality: Nigger Creek, altitude 1,200 meters, Chelan County, Washington. June-Aug.

14. *Silene Lemmonii* S. Wats. Lemmon's Campion. Fig. 1733.

Silene Lemmonii S. Wats. Proc. Amer. Acad. 10: 342. 1875.

Silene Palmeri S. Wats. Proc. Amer. Acad. 10: 342. 1875.

Silene longistylis Engelm. Proc. Amer. Acad. 22: 469. 1887.

Silene deflexa Eastw. Bot. Gaz. 41: 284. 1906.

Perennial, with slender branching rootstocks arising from a taproot, puberulent and finely glandular, the stems several, erect or decumbent, 15-35 cm. high. Leaves mostly basal, oblanceolate to linear-lanceolate, 1.5-2.5 cm. long, narrowed at the base; flowers in a loose, few-flowered panicle, nodding in anthesis; calyx oblong, extended to obovoid in fruit, 6-10 mm. long, scarious between the green nerves, the alternating nerves broader and extending to the short triangular teeth; petals white to pale yellow or pink, 4-cleft, the segments elongated and narrowly linear, entire, appendages erect, entire or lobed, claws woolly-pubescent; stamens long-exserted.

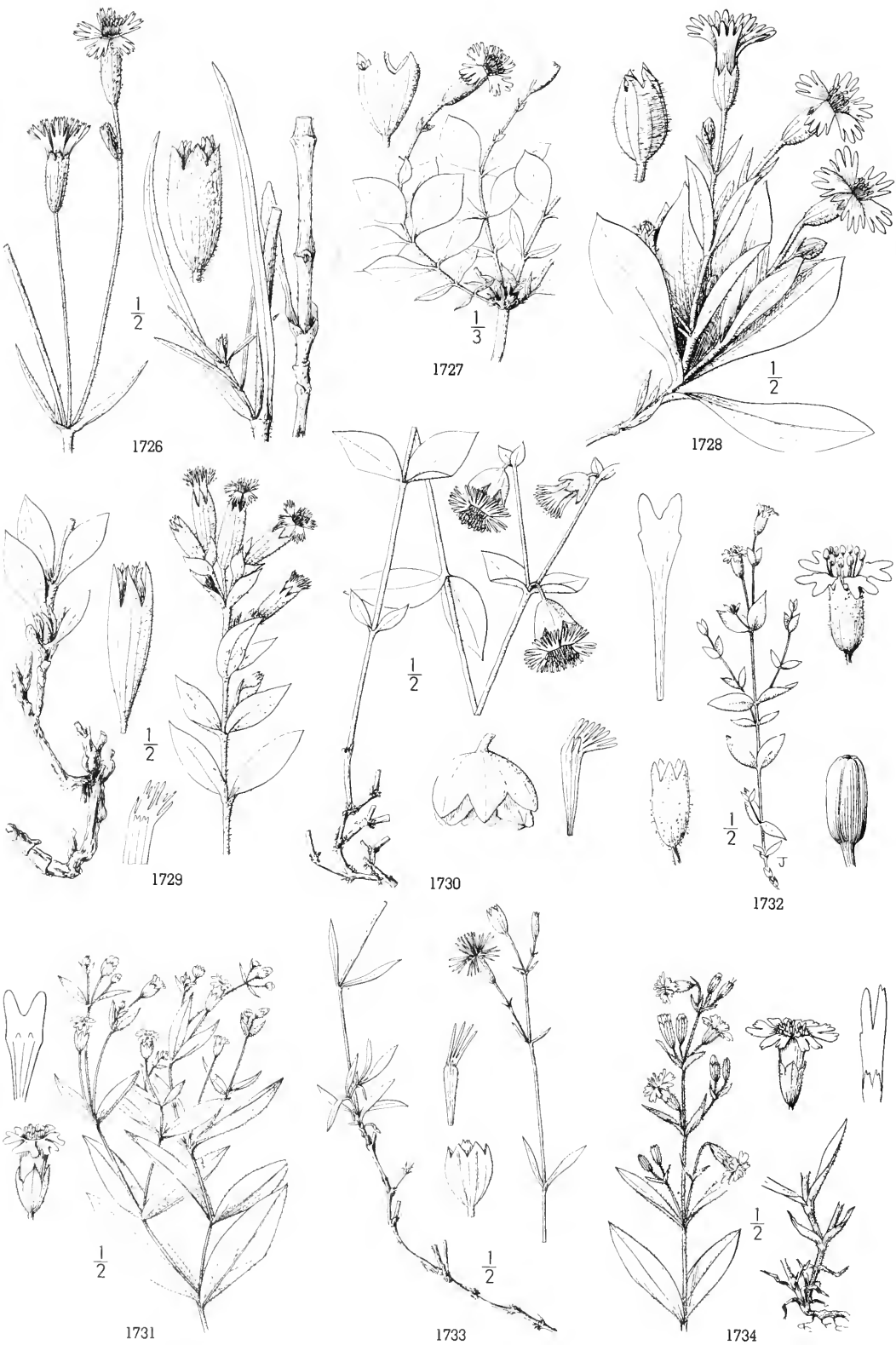
Open coniferous forests, Arid Transition Zone; Siskiyou Mountains, southern Oregon, to the Cuyamaca Mountains, southern California. Type locality: Sierra County, California. June-Aug.

15. *Silene Bridgesii* Rohrb. Bridges' Campion. Fig. 1734.

Silene Bridgesii Rohrb. Ind. Sem. Hort. Berl. App. 2: 5. 1867.

Silene incompta A. Gray, Proc. Amer. Acad. 7: 330. 1868.

Perennial, glandular-pubescent, the stems erect, 3-8 dm. high, rather leafy, 1-4 arising from the crown of a taproot. Leaves 2.5-7.5 cm. long, lanceolate to oblanceolate, acute or acuminate, sessile; inflorescence verticillately racemose or narrowly paniculate, the flowers nodding; calyx broadly cylindric, becoming obovoid in fruit, 9-13 mm. long, the teeth triangular-lanceolate, acute, about one-fourth the length of the tube; petals well exerted, white or tinged with purple, 2-cleft



1726. *Silene laciniata*
1727. *Silene californica*
1728. *Silene Hookeri*

1729. *Silene Parishii*
1730. *Silene campanulata*
1731. *Silene Menziesii*

1732. *Silene Seelyi*
1733. *Silene Lemmonii*
1734. *Silene Bridgesii*

into linear entire segments, appendages unevenly lobed; stamens and style long-exserted; capsule ovoid-globose.

Open coniferous forests, Arid Transition Zone; western slopes of the Sierra Nevada, California. Type locality: Yosemite Valley, California. June-July.

16. *Silene pectinàta* S. Wats. Carson Campion. Fig. 1735.

Silene pectinata S. Wats. Proc. Amer. Acad. 10: 344. 1875.

Perennial, very glandular-pubescent, the stems erect, 6-8 dm. high, one or several from the crown of a taproot. Leaves mostly basal, 8-18 cm. long, lanceolate to oblanceolate, acute or acuminate, narrowed to a long winged petiole, the upper leaves remote, reduced and sessile; flowers in a narrow, few-flowered panicle, erect; calyx cylindric, becoming ovoid in fruit, 15-18 mm. long, the teeth narrowly lanceolate, one-half the length of the tube; petals deep red or purple, the blades cuneate, 2-cleft with a broad sinus, the segments rounded, appendages narrowly lanceolate, 2-toothed or entire; capsule ovoid, sessile or nearly so.

Dry mountain slopes and valleys, Arid Transition Zone; southeastern Oregon south, east of the Cascade-Sierra Nevada Divide, to Mono County, California, and western Nevada. Type locality: near Carson City, Nevada. June-Aug.

17. *Silene apérta* Greene. Naked Campion. Fig. 1736.

Silene aperta Greene, Leaflets Bot. Obs. 1: 75. 1904.

Perennial, puberulent, the stems very slender, 2-3 dm. high, one to several arising from the crown of a taproot. Leaves mostly basal, narrowly linear or linear-subulate, 3-8 cm. long, those of the stem of only 1 or 2 pairs; flowers terminal and solitary or racemose with 1 or 2 flowers at each of the upper two or three nodes; calyx-tube campanulate, 3-5 mm. long, the teeth equaling or exceeding the tube, lanceolate, scarious-margined; petals nearly twice the length of the calyx, white or tinged with purple, shallowly 4-lobed, the claws broad and hairy-tomentulose, appendages and auricles none; capsule oblong, exceeding the calyx.

Open coniferous forests, Arid Transition and Canadian Zones; southern Sierra Nevada, California. Type locality: Hockett Meadows, altitude 8,600 feet, Tulare County, California. July-Aug.

18. *Silene occidentàlis* S. Wats. Western Campion. Fig. 1737.

Silene occidentalis S. Wats. Proc. Amer. Acad. 10: 343. 1875.

Perennial, glandular-pubescent and somewhat tomentulose below, the stems erect, stout, 3-6 dm. high, arising from the crown of a stout taproot. Lower leaves 5-8 cm. long, oblanceolate, acute, narrowed to a margined petiole, the upper reduced, linear or lanceolate, sessile; inflorescence a loose panicle; calyx narrowly cylindric, 15-25 mm. long, the teeth 2-3 mm. long, obtuse; petals nearly twice as long as the calyx, white or tinged with purple, 4-cleft into narrowly linear, entire segments, appendages linear, nearly entire, auricles none; capsule oblong, stipitate.

Open pine forests, Arid Transition Zone; Sierra Nevada, from Modoc County to Tulare County, California. Type locality: Sierra County. June-July.

Silene occidentalis var. *náncta* Jepson, Fl. Calif. 507. 1914. Petals cut into 2 divergent lobes, with 1 small lateral tooth, appendages lanceolate, elongated, entire. Known only from the original collection in Hockett Meadows, Sierra Nevada, Tulare County, California.

19. *Silene bernardìna* S. Wats. Palmer's Campion. Fig. 1738.

Silene bernardina S. Wats. Proc. Amer. Acad. 24: 82. 1889.

Perennial, finely glandular-pubescent throughout, the stems several, arising from slender rootstocks derived from a taproot, erect, 1.5-4 dm. high, slender. Leaves mostly basal, narrowly linear-oblanceolate, 2.5-5 cm. long; flowers few, 1-4, on slender pedicels; calyx cylindric, 15 mm. long, the teeth broadly lanceolate, acute, scarious-margined; petals white, well exserted, 2-cleft with the divergent lobes again cleft to the middle, the claws hairy toward the base, appendages elongated, cleft nearly to the base into two narrow segments, these linear or redivided; stamens included; capsule oblong, short-stipitate.

Open coniferous forests, Arid Transition Zone; southern Sierra Nevada, California. Type locality: on shady slopes, Long Meadow, Tulare County, California. June-Aug.

20. *Silene oregàna* S. Wats. Oregon Campion. Fig. 1739.

Silene oregana S. Wats. Proc. Amer. Acad. 10: 343. 1875.

Perennial, finely pubescent and viscid, the stems erect, 2.5-4 dm. high, one to several from a branching rootstock. Leaves oblanceolate to lanceolate, acute, 3-7 cm. long, the lower narrowed to an elongated margined petiole, the upper sessile and reduced; inflorescence a narrow many-flowered raceme or panicle; calyx oblong-cylindric, scarious between the green nerves, 12-15 mm. long, the teeth 3 mm. long, acute; petals white, 4-cleft, the two inner segments broad and again cleft, the two outer narrower and entire, the claws glabrous, appendages 2-cleft nearly to the base into linear segments, auricles narrow; capsule oblong, its stipe 4 mm. long.

Coniferous forests, Boreal Zones; Mount Adams, Washington, the Gearhart and Blue Mountains, Oregon, and the Warner Mountains, California, east to Idaho and Montana. Type locality: Blue Mountains, Oregon. July-Sept.

21. *Silene montàna* S. Wats. Mountain Campion. Fig. 1740.

Silene montana S. Wats. Proc. Amer. Acad. 10: 343. 1875.

Silene Shockleyi S. Wats. Proc. Amer. Acad. 25: 127. 1890.

Silene Gormanii Howell, Fl. N.W. Amer. 77. 1897.

Silene montana var. *viscida* Henderson, Rhodora 32: 25. 1930.

Silene filisecta M. E. Peck, Proc. Biol. Soc. Wash. 4: 186. 1934.

Perennial, puberulent and glandular above, the stems erect, 1.5–3 dm. high, many, arising from the crown of a taproot. Basal leaves numerous, oblanceolate, 2.5–5 cm. long, narrowed to a slender elongated petiole, those of the stem rather remote, linear-lanceolate, sessile or nearly so; inflorescence a spicate raceme; calyx cylindric, 12–15 mm. long, scarious between the green nerves, the teeth 3 mm. long, acute; petals greenish white or tinged with rose, 4- or 6-cleft into narrow segments, the claws glabrous, appendages fimbriate or toothed; capsule oblong-ovoid, its stipe 5 mm. long.

Open coniferous forests, Arid Transition Zone; Crater Lake and Siskiyou Mountains, southern Oregon, to the North Coast Ranges and the southern Sierra Nevada, California, and adjacent Nevada. Type locality: near Carson City, Nevada. June–Aug.

22. *Silene grándis* Eastw. Coast Campion. Fig. 1741.

Silene grandis Eastw. Bull. Torrey Club 30: 487. 1903.

Perennial, densely grayish pubescent, the stems erect, 3–5 dm. high, very stout and much thickened at the nodes, leafy throughout. Leaves 3–7.5 cm. long, broadly ovate, acutish, the lower petioled, the upper sessile; flowers clustered in the upper axils, the pedicels stout, erect; calyx oblong-campanulate, 12–16 mm. long, scarious between the green nerves, the teeth 2 mm. long, very obtuse; petals greenish white, unequally 4-cleft, the two middle lobes broad, truncate, toothed, the lateral shorter, narrowly lanceolate and divergent, the claws glabrous, appendages truncate, toothed, auricles narrow and rounded; capsule oblong, stipitate, slightly exceeding the calyx.

Sea bluffs, Humid Transition Zone; Sonoma and Marin Counties, California. Type locality: Bodega Point, Sonoma County. May–Aug.

23. *Silene pacífica* Eastw. Pacific Campion. Fig. 1742.

Silene pacifica Eastw. Bot. Gaz. 41: 285. 1906.

Silene grandis var. *pacifica* Jepson, Fl. Calif. 510. 1914.

Perennial, minutely pubescent, glandular above, the stems erect, 3–6 dm. high. Basal leaves oblanceolate, their blades 3–7 cm. long, narrowed to a petiole of about equal length, the upper leaves reduced, and narrowed to a sessile base; flowers clustered in the upper axils, subtended by foliaceous bracts; pedicels short, erect; calyx 15 mm. long, the tube tubular, truncate at base, very viscid, prominently green- or purplish-veined, teeth 4 mm. long with white or purplish margins; petals 15 mm. long, claret-colored with white claws, the blade deeply cleft, with the lobes entire, lacinate or bilobed, appendages laciniolate-dentate; capsule 1 cm. long; stipe stout; seeds light brown, slightly pitted.

Seacoast, Humid Transition Zone; Humboldt County to San Mateo County, California. Type locality: Rodeo Lagoon, Marin County, California. April–Sept.

24. *Silene Scouleri* Hook. Scouler's Campion. Fig. 1743.

Silene Scouleri Hook. Fl. Bor. Amer. 1: 88. 1830.

Silene Drummondii A. Gray, Proc. Amer. Acad. 8: 377. 1873.

Perennial, puberulent below, densely glandular above, the stems erect, 2–7 dm. high, arising from the branching crown of a taproot. Basal leaves oblanceolate or spatulate, 2–6 cm. long, narrowed to a petiole of equal length or longer; stem leaves linear-oblanceolate to linear-lanceolate, sessile; flowers in an interrupted spicate raceme, usually several at the nodes; calyx 12–14 mm. long, oblong, scarious between the green nerves, the teeth acutish, ciliate; petals white or tinged with purple, well exserted, 2-cleft, and sometimes with a lateral tooth on each side, the segments emarginate or toothed, appendages blunt, denticulate, auricles narrow, slightly laciniolate; capsule with a stipe 2–4 mm. long.

Dry prairies, Transition Zone; Vancouver Island to Curry County and Willamette Valley, Oregon, east to Idaho and Colorado. Type locality: Vancouver, Washington. July–Aug.

Silene insectivora Henderson, Rhodora 32: 24. 1930. Perennial, the stems 6–18 cm. high, densely glandular throughout. Lower leaves obovate-spatulate to linear-oblanceolate, 4 cm. or more long, the upper reduced to bracts, 1–2 cm. long; peduncles branched, 1–3 cm. long; calyx 15–20 mm. long, the lobes narrowly triangular to ligulate, often one-third the length of the tube, glandular-pubescent; petals narrowly cuneate, the blade bifid, appendages narrowly lanceolate, the claw somewhat lacerate above; ovary oblong. Known only from the type collection: "in meadows of Sprague River, Klamath County, Oregon."

25. *Silene scapòsa* Robinson. Blue Mountain Campion. Fig. 1744.

Silene scaposa Robinson, Proc. Amer. Acad. 28: 145. 1893.

Perennial, finely puberulent, sparingly glandular above, the stems simple, erect, several from the crown of a stout taproot. Basal leaves numerous, oblanceolate, 3–5 cm. long, narrowed to a winged petiole of about equal length, the stem leaves of only 1 or 2 pairs, narrowly linear, sessile; flowers in a narrow panicle; pedicels slender; calyx oblong, 10–12 mm. long, scarious between the purplish or green nerves, the teeth scarious-margined; petals white, scarcely exceeding the calyx, blades short, shallowly 2-cleft, the segments broad, appendages minute, obtuse, auricles slightly saccate; capsule short-stipitate.

Mountain slopes, Arid Transition Zone; northeastern Oregon from Gilliam and Wheeler Counties to the Blue Mountains. Type locality: Blue Mountains, Oregon. June–Aug.

26. *Silene verecúnda* S. Wats. Dolores Campion. Fig. 1745.

Silene Engelmannii var. *Behrii* Rohrb. *Linnaea* 36: 264. 1869.

Silene verecúnda S. Wats. *Proc. Amer. Acad.* 10: 344. 1875.

Silene luisana S. Wats. *Proc. Amer. Acad.* 23: 261. 1888.

Silene Behrii F. N. Williams, *Journ. Linn. Soc.* 32: 180. 1896.

Perennial, densely glandular-pubescent, the stems decumbent at base, 1–2 dm. high, several from the crown of a taproot. Basal leaves narrowly to broadly oblanceolate, acute to short-acuminate, 2–5 cm. long, narrowed to a winged petiole of shorter length; stem leaves linear-lanceolate, sessile; flowers few to several, in a loose irregular panicle or raceme, erect, the pedicels rather stout; calyx oblong-cylindric, 10–12 mm. long, densely glandular-pubescent, the teeth oblong, obtuse, scarious-margined; petals pale rose, well exserted, 2-cleft, the segments oblong, entire or emarginate, with or without nearly obsolete lateral lobes, the claws glabrous, appendages broadly oblong, blunt, auricles narrow, rounded; stamens and style included; capsule short-stipitate; seeds papillate, the papillae developed into a crest on the margin.

Grassy slopes, Upper Sonoran Zone; near the coast of central California from San Francisco to San Luis Obispo County. Type locality: rocky hills, near Mission Dolores, San Francisco. March–June.

27. *Silene platyòta* S. Wats. Cuyamaca Campion. Fig. 1746.

Silene platyota S. Wats. *Proc. Amer. Acad.* 17: 366. 1882.

Silene verecúnda var. *platyota* Jepson, *Fl. Calif.* 509. 1914.

Perennial, minutely puberulent and glandular above, the stems erect, several from the branching crown, 3–7 dm. high. Lower leaves narrowly oblanceolate, 4–7 cm. long, narrowed to a winged petiole; stem leaves narrowly linear, tapering above to the acute apex; inflorescence a loose panicle; pedicels slender; calyx cylindric; 10–12 mm. long, scarious between the green nerves, the teeth acute, ciliate on the margins; petals greenish white, well exserted, the blades 2-cleft to less than half their length, the segments oblong, entire or irregularly notched, with or without 2 nearly obsolete lateral teeth, appendages narrowly oblong, auricles rounded, entire or sublacerate; capsule ovoid, short-stipitate; seeds tessellate on the sides and crested with a single row of tubercles.

Open coniferous forests, Arid Transition Zone; southern Sierra Nevada and the Inner Coast Ranges from San Benito County to San Diego County, California. Type locality: Cuyamaca Mountains, California. June–Aug.

Silene Spaldingii S. Wats. *Proc. Amer. Acad.* 10: 344. 1875. Perennial, glandular-tomentose, the stems several, 3 dm. high, very leafy. Leaves lanceolate, 3–5 cm. long, sessile; flowers in a strict cymose panicle or subspicate; calyx cylindric, becoming obconic and constricted about the stipe in fruit, 14–16 mm. long; the teeth triangular-lanceolate, acute; petals greenish white, not exceeding the calyx, the claw broad and spatulate, broadly auricled, the blades very minute with 2 short entire blunt or triangular teeth, appendages small; capsule ovoid-oblong, short-stipitate. Rocky ground, Arid Transition Zone; Union County, Oregon, and southeastern Washington, to central Idaho; rarely collected. Type locality: on the Clearwater River, Idaho.

28. *Silene Douglasii* Hook. Douglas' Campion. Fig. 1747.

Silene Douglasii Hook. *Fl. Bor. Amer.* 1: 88. 1830.

Silene multicaulis Nutt. in Torr. & Gray, *Fl. N. Amer.* 1: 192. 1838.

Silene elata S. Wats. *Proc. Amer. Acad.* 12: 249. 1877.

Silene columbiana Howell, *Fl. N.W. Amer.* 78. 1897.

Silene dilatata Suksdorf, *Deutsch. Bot. Monatss.* 16: 312. 1898.

Silene oraria M. E. Peck, *Torreya* 32: 148. 1932.

Perennial, finely puberulent and only slightly or not at all glandular above, the stems many from a branching rootstock, erect, slender, 2–6 dm. high. Leaves narrowly oblanceolate to narrowly linear, more or less puberulent, 5–8 cm. long; inflorescence a few-flowered open cyme; calyx oblong or obovoid, 10–14 mm. long, more or less puberulent, the teeth obtuse, scarious on the margins; petals white or pink, 2-cleft, the segments entire, appendages oblong, entire, auricles present; capsule ovoid, short-stipitate.

Open coniferous forest in rocky places, Transition and Boreal Zones; British Columbia to central California, east to Montana. Type locality: above the Grand Rapids of the Columbia. June–Aug. A variable species, and several of the above synonyms have been proposed as varieties.

29. *Silene Macounii* S. Wats. Macoun's Campion. Fig. 1748.

Silene Lyallii S. Wats. *Proc. Amer. Acad.* 10: 342, in part. 1875.

Silene Macounii S. Wats. *Proc. Amer. Acad.* 26: 124. 1891.

Silene Douglasii var. *viscida* Robinson, *Proc. Amer. Acad.* 28: 145. 1893.

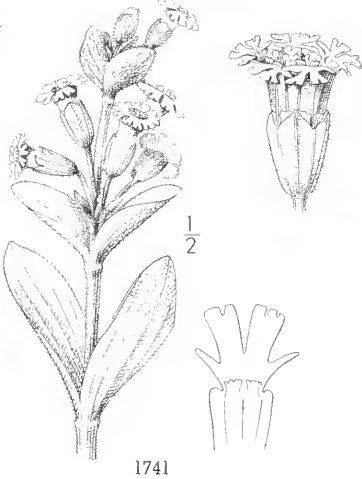
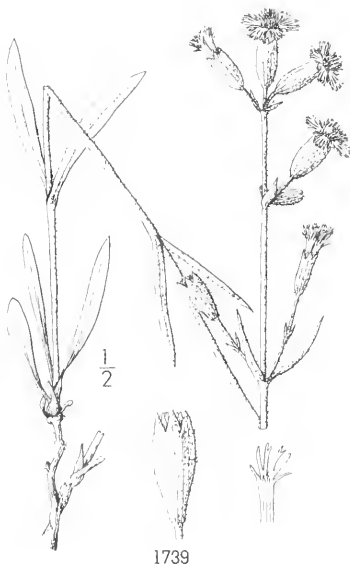
Perennial, finely puberulent and rather densely glandular above, the stems several from a branching rootstock, erect, 1–3 dm. high. Leaves linear-lanceolate or narrowly oblanceolate, 5–7 cm. long, puberulent; calyx oblong-campanulate, 8–10 mm. long, usually purple-tinged, the teeth short, obtuse; petals white or brownish purple, exserted, the blades 2-cleft and with a linear lateral tooth on each side, the claws auricled, glabrous, appendages oblong or quadrate; capsule stipitate.

High mountain slopes, Boreal Zones; British Columbia, south through the Olympic and Cascade Mountains to Oregon, and east to Alberta and Utah. Type locality: summit of the Rocky Mountains, British Columbia. June–Aug.

30. *Silene Grayi* S. Wats. Gray's Campion. Fig. 1749.

Silene Grayi S. Wats. *Proc. Amer. Acad.* 14: 291. 1879.

Perennial, puberulent, glandular above, the stems caespitose, erect, 1–2 dm. high. Leaves 1.5–2 cm. long, linear to oblanceolate, the basal numerous and crowded, the cauline few and



1735. *Silene pectinata*
1736. *Silene aperta*
1737. *Silene occidentalis*

1738. *Silene bernardina*
1739. *Silene oregana*
1740. *Silene montana*

1741. *Silene grandis*
1742. *Silene pacifica*



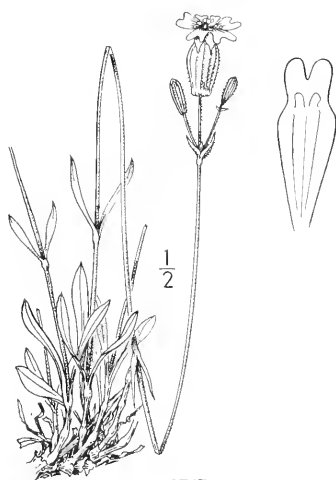
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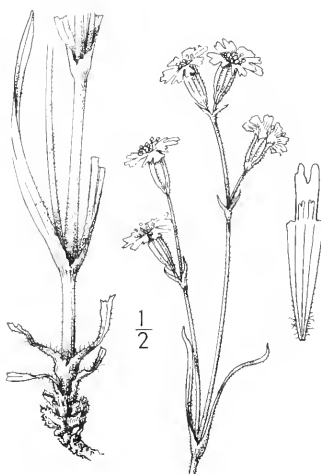
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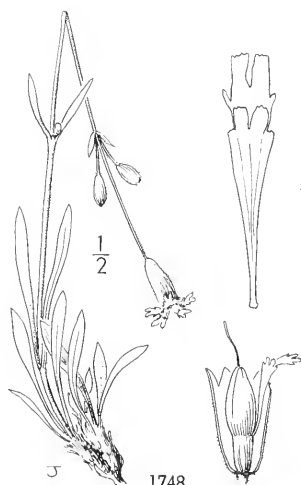
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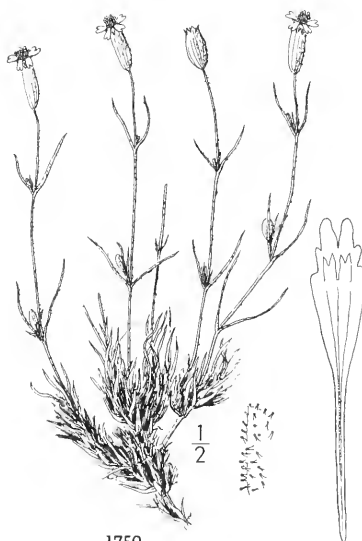
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1749



1750

1743. *Silene Scouleri*
 1744. *Silene scaposa*
 1745. *Silene verecunda*

1746. *Silene platyota*
 1747. *Silene Douglasii*
 1748. *Silene Macounii*

1749. *Silene Grayi*
 1750. *Silene Watsonii*

reduced; flowers few, 1-5; calyx-tube purplish, broadly cylindric, becoming ovoid in fruit, 8-10 mm. long, the teeth broad; petals rose, 2-cleft, each lobe with an elongated lateral tooth, appendages broad, entire or eroded, auricles narrow, truncate; capsule ovoid, subsessile.

High mountains above timberline, Arctic-Alpine Zone; Siskiyou County, California. Known from Preston Peak, Mount Eddy, Mount Shasta, and Medicine Lake Mountains. Type locality: Mount Shasta, above timber line and near snow. July-Aug.

31. *Silene Watsonii* Robinson. Watson's Campion. Fig. 1750.

Lychnis californica S. Wats. Proc. Amer. Acad. 12: 248. 1887.

Silene Watsonii Robinson, Proc. Amer. Acad. 28: 143. 1893.

Silene lacustris Eastw. Bot. Gaz. 41: 284. 1906.

Perennial, nearly glabrous below, puberulent and glandular above, the stems cespitose, erect, 1-2.5 dm. high, slender. Lower leaves narrowly oblanceolate, 1.5-4 cm. long, the lower numerous and crowded, the upper few, linear and reduced; flowers 1-5, in a loose terminal cluster; calyx broadly cylindric, becoming ovoid in fruit, 10-15 mm. long, scarious between the purple, more or less anastomosing veins, the teeth 3 mm. long, obtuse, scarious-margined; petals whitish, tipped with purple, their blades 2-3 mm. long, 2-cleft, each segment usually with a lateral tooth, appendages quadrate, eroded; capsule ovoid; stipe 1-2 mm. long.

High mountains, mostly above timber line, Hudsonian and Arctic-Alpine Zones; southern Cascade and Siskiyou Mountains, Oregon, to the southern Sierra Nevada, California. Type locality: near Ebbett's Pass, California. July-Sept.

32. *Silene Suksdorfii* Robinson. Suksdorf's Campion. Fig. 1751.

Silene Suksdorfii Robinson, Bot. Gaz. 16: 44. 1891.

Perennial, densely short-pubescent and glandular above, the stems cespitose, 4-10 cm. high. Lower leaves crowded, oblanceolate, 1.5-2.5 cm. long, acute, the upper few, 1-2 pairs, linear; flowers 1-4; calyx broadly cylindric, ovoid in fruit, 10-12 mm. long, scarious between the purple veins, the teeth broadly scarious-margined, obtuse; petals white, the blades short, little exceeding the calyx, shallowly bifid into entire or minutely eroded lobes, appendages obtuse to truncate at apex; capsule ovoid; stipe 2-3 mm. long.

High mountain slopes, above timber line, Arctic-Alpine Zone; Cascade Mountains from Mount Stuart, Washington, to The Three Sisters, Oregon. Type locality: Mount Adams (Paddo), Washington. July-Sept.

14. *LYCHNIS* L. Sp. Pl. 436. 1753.

Perennial erect herbs, with opposite leaves. Calyx 5-toothed, the tube varying from tubular to inflated, 10-nerved. Petals 5, with a narrow elongated claw and an entire 2-cleft or lacinate blade, often crowned. Stamens 10. Styles 5, rarely 4. Ovary 1-celled. Capsule dehiscing by twice as many valves as styles. Seeds many. [Greek, meaning lamp, in allusion to the flame color of some of the flowers.]

About 35 species, inhabiting the north temperate and arctic zones. Type species, *Lychnis chalconica* L.

Plants glandular-pubescent; flowers white or pinkish.

1. *L. alba*.

Plants densely white-woolly; flowers crimson.

2. *L. Coronaria*.

1. *Lychnis álba* Mill. White Campion. Fig. 1752.

Lychnis alba Mill. Gard. Dict. ed. 8. no. 4. 1768.

Lychnis vespertina Sibth. Fl. Oxon. 146. 1794.

Biennial, glandular-pubescent throughout, usually dioecious, the stems erect, freely branching, 3-6 dm. high. Leaves lanceolate to ovate-oblong, 3-7 cm. long, the lower narrowed to a petiole, the upper sessile; flowers in an open panicle, night-blooming, very fragrant; calyx-tube tubular, becoming distended in fruit, 10-12 mm. long, the teeth lanceolate-subulate, 5-6 mm. long; petal-blades obovate, about 10 mm. long, 2-cleft, nearly erect.

Low moist waste places, sparingly introduced in Washington and Oregon. Native of Europe. June-Aug.

2. *Lychnis Coronària* (L.) Desr. Mullein Pink. Fig. 1753.

Agrostemma Coronaria L. Sp. Pl. 436. 1753.

Lychnis Coronaria Desr. in Lam. Encycl. 3: 643. 1789.

Erect, densely white-woolly perennial, the stems stout, simple or branched, 3-8 dm. high. Leaves 5-10 cm. long, the lower spatulate with winged petioles, the upper oblong or lanceolate, sessile; flowers few, in open terminal panicles, long-pedicelled; calyx-tube oblong-campanulate, 10-12 mm. long, the teeth subulate, twisted, shorter than the tube; petals crimson.

Roadsides and fields, an escape from gardens in Oregon and Washington. Native of Europe. June-Aug. Rose Campion.

15. *VACCÀRIA* Medic. Phil. Bot. 1: 96. 1789.

Glabrous annuals with erect, dichotomously branching stems. Leaves opposite, ovate to lanceolate, clasping. Flowers in terminal open cymes, slender-pedicelled, rather showy. Calyx 5-toothed, tubular in flower, becoming sharply 5-angled and inflated in fruit. Petals well exceeding the calyx, unappendaged, red or pink. Stamens 10. Styles 2. Capsule

4-toothed; seeds laterally attached. [Name Latin, meaning cow, in allusion to the plant's value for fodder.]

Three species, natives of Eurasia. Type species, *Saponaria Vaccaria* L.

1. *Vaccaria vulgaris* Host. Cow-herb, Cockle. Fig. 1754.

Saponaria Vaccaria L. Sp. Pl. 409. 1753.

Vaccaria vulgaris Host, Fl. Aust. 1: 518. 1827.

Vaccaria Vaccaria Britt. Ill. Fl. 2: 18. 1897.

Stems 3–10 dm. high, dichotomously branched above. Leaves lanceolate to ovate-lanceolate, 3–7 cm. long, connate at base; pedicels slender, bibracteate at base; calyx-tube becoming ovoid, 10–13 mm. long, pallid between the winged angles, the teeth lanceolate-triangular, 3 mm. long; petals pale red, exserted 5–10 mm. beyond the calyx, crenulate.

Waste places and fields, becoming widely distributed over the Pacific States. Native of Europe. May–Aug.

16. *DIÁNTHUS* L. Sp. Pl. 409. 1753.

Perennial or rarely annual herbs, with rather stiff stems and usually narrow leaves. Flowers usually purple, showy, in terminal cymose panicles or solitary. Calyx 5-toothed, the tube cylindric, finely many-striate. Petals long-clawed, toothed. Stamens 10. Styles 2. Ovary 1-celled, stipitate. Capsule oblong-cylindric, stipitate, dehiscent at the summit by 4 or 5 short teeth. Seeds compressed, laterally attached; embryo straight, eccentric. [Name Greek, the flower of Zeus or Jove.]

About 200 species inhabiting the Old World, one arctic species of Siberia extending into arctic America. An important group of ornamental plants including the pinks and carnations. Type species, *Dianthus Caryophyllus* L.

1. *Dianthus Arméria* L. Deptford Pink, Grass Pink. Fig. 1755.

Dianthus Armeria L. Sp. Pl. 410. 1753.

Stiffly erect annual, finely pubescent throughout, 15–45 cm. high. Leaves linear-erect, 2.5–7.5 cm. long, 2–4 mm. wide; flowers terminal, solitary or usually in few-flowered clusters; bracts lanceolate-subulate, exceeding the calyx; calyx-teeth subulate; petals pink with whitish spots, exserted about 3–5 mm.

Waste places and roadsides, sparingly established in Oregon and Washington. Native of Europe. June–Aug.

Dianthus barbatus L. Sp. Pl. 409. 1753. (Sweet William) Occasionally growing spontaneously in western Oregon and northern California.

17. *SAPONÁRIA* L. Sp. Pl. 408. 1753.

Annual or perennial herbs with erect or diffuse stems, mostly broad leaves and showy flowers. Calyx 5-toothed, the tube ovoid or cylindric, obscurely nerved. Petals 5, long-clawed, entire or emarginate. Stamens 10. Styles 2; ovary 1-celled or incompletely 2–4-celled. Capsule ovoid or oblong, dehiscent by 4 short apical teeth. [Name from the Latin *sapo* meaning soap, the juice being saponaceous.]

About 20 species, inhabiting Eurasia and northern Africa. Type species, *Saponaria officinalis* L.

1. *Saponaria officinalis* L. Bouncing Bet, Soapwort. Fig. 1756.

Saponaria officinalis L. Sp. Pl. 408. 1753.

Stout, erect, glabrous perennial, the stems simple or sparingly branched, leafy, 3–6 dm. high. Leaves lanceolate to ovate, 5–7 cm. long, acute, narrowed at base to a short broad petiole, prominently 2–5-nerved; flowers in a dense terminal corymb; bracts foliaceous or reduced and very narrow; calyx-tube cylindric or nearly so, 15–20 mm. long, the teeth lanceolate, 2 mm. long; petals obcordate, well exserted and spreading, with a scale at the base of the blade; pod included, narrowly oblong.

Fields and waste places, locally established in the Pacific States from Washington to northern California. Native of Europe. June–Sept.

18. *VELEZIA* [Loefl.] L. Sp. Pl. 332. 1753.

Annual herbs with rigid, dichotomously branching stems and subulate leaves. Flowers subsessile, solitary in the axils of the leaves or congested at the ends of the branches. Calyx 5-toothed, narrowly cylindric, with 5 or 15 ribs. Petals 5, long-clawed, the blades small, entire or 4-toothed with small ciliate crests. Styles 2; ovary 1-celled. Capsule narrowly linear, 4-valved at apex. Seeds orbicular or ovoid, embryo straight. [Name in honor Cristobal Velez, a friend of Loeffling.]

Four species, inhabiting the Mediterranean region. Type species, *Velezia rigida* L.

1. *Velezia rigida* L. Velezia. Fig. 1757.

Velezia rigida L. Sp. Pl. 332. 1753.

Annual, branching from the base, the branches simple or dichotomously branching, spreading,

1-4 dm. long, minutely glandular-pubescent. Leaves subulate, 10-15 mm. long, ciliate near the base; flowers solitary in the axils of all but the lowest leaves; calyx-tube terete, 10-12 mm. long, 1 mm. thick, teeth subulate, scarcely 2 mm. long; blades of the petals narrow, 2-3 mm. long, purple-tipped; capsule very slender, not distending the calyx-tube.

Dry ridges, Upper Sonoran and Arid Transition Zones; locally established in Humboldt, Stanislaus, Eldorado, and Tuolumne Counties, California. Native of southern Europe. May-June.

Family 44. NYMPHAEACEAE.

WATER LILY FAMILY.

Perennial, acaulescent, aquatic herbs, with horizontal, often tuberous rootstocks and peltate or cordate, floating or submersed leaves. Flowers solitary in the axils, peduncled. Sepals 3 to many, often petaloid. Petals 3 to many, sometimes stamen-like. Stamens 3 to many, hypogynous, filaments usually broad. Carpels 2 to many, distinct or united into a compound ovary. Ovules 2 to many, orthotropous or anatropous; endosperm present or absent; cotyledons thick. Fruit coriaceous, or a firm-rind berry.

A family of 8 genera and about 50 species, of wide geographical distribution, inhabiting fresh water.

Leaves peltate; sepals and petals 3 each; carpels distinct.

1. *Brasenia*.

Leaves with a narrow sinus; sepals 5-12; petals numerous, stamen-like; carpels united into a compound ovary.

2. *Nymphaea*.

1. BRASÈNIA Schreb. Gen. Pl. 372. 1789.

Stems slender, the surfaces of these, petioles, lower side of leaf and peduncles covered with gelatinous matter. Leaves alternate, centrally peltate, long-petioled, floating. Flowers purple. Sepals and petals 3 each. Stamens 12-18; filaments filiform; anthers extrorse. Carpels 4-18, separate; ovules 1-2, pendulous on the dorsal suture. Fruiting carpels separate, indehiscent, coriaceous. Seeds with fleshy endosperm. [Origin of name unexplained.]

A monotypic genus of wide distribution.

1. *Brasenia Schreberi* J. F. Gmelin. Water-shield. Fig. 1758.

Brasenia Schreberi J. F. Gmelin, Syst. Veg. 1: 853. 1796.

Hydropeltis purpurea Michx. Fl. Bor. Amer. 1: 324. pl. 29. 1803.

Brasenia peltata Pursh, Fl. Amer. Sept. 389. 1814.

Brasenia purpurea Casp. in Engler & Prantl, Nat. Pflanzenf. 3: Abt. 2, 6. 1890.

Stems arising from slender rootstocks. Leaves broadly oval, rounded at both ends, 5-10 cm. long, entire, thick; sepals and petals 10-15 mm. long, linear-oblong; fruiting carpels oblong, 6-8 mm. long.

Ponds and slow streams, Boreal and Austral Zones; widely distributed over North America, tropical Asia, Australia and western Africa. In the Pacific States, locally distributed from British Columbia to central California. Type locality: none given. June-Aug.

2. NYMPHAEÀ [Tourn.] L. Sp. Pl. 510. 1753.

Aquatic herbs with cylindric rootstocks. Leaves large, cordate with a deep narrow sinus. Flowers long-peduncled, showy, yellow or purple. Sepals 5-12, concave, thick, persisting until decayed. Petals many, stamen-like. Stamens many, hypogynous; anthers introrse; filaments broad. Carpels united in a compound ovary; stigmas many, radiate as in *Papaver*; ovules numerous on the ovary walls. Fruit baccate with a firm thick rind; seeds numerous, with endosperm. [Name Greek, water-nymph.]

A genus of about 8 species, natives of the north temperate zone. Type species, *Nymphaea lutea* L.

1. *Nymphaea polysépala* (Engelm.) Greene. Indian Pond Lily or Wokas. Fig. 1759.

Nuphar polysepalum Engelm. Trans. St. Louis Acad. 2: 282. 1865.

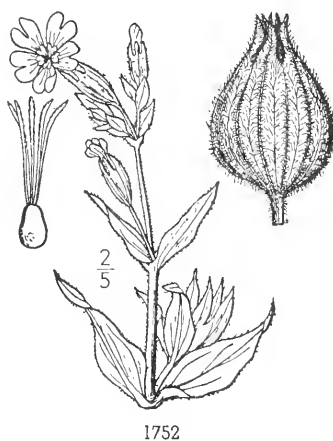
Nymphaea polysepala Greene, Bull. Torrey Club 15: 84. 1888.

Leaves long-petioled, floating or sometimes raised above the surface, broadly oval, 15-45 cm. long; sepals 6-12, yellow, often tinged with red, rounded and concave, 2-2.5 cm. long; petals 12-18, narrowly cuneate, mostly concealed by the numerous stamens; anthers reddish; stigma 15-25-rayed; fruit ovoid, about 3.5 cm. in diameter, with a constricted neck and convex disk.

Ponds and slow streams, Boreal and Transition Zones; Alaska to Mariposa and San Luis Obispo Counties, California, east to the Black Hills, South Dakota, and Colorado. Type locality: sources of the Platte, near Long's Peak, Colorado. April-Sept.



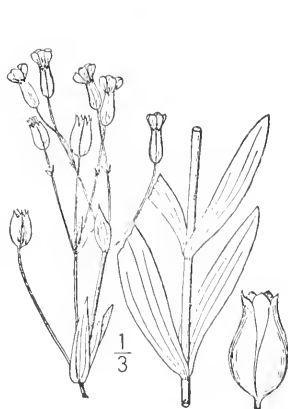
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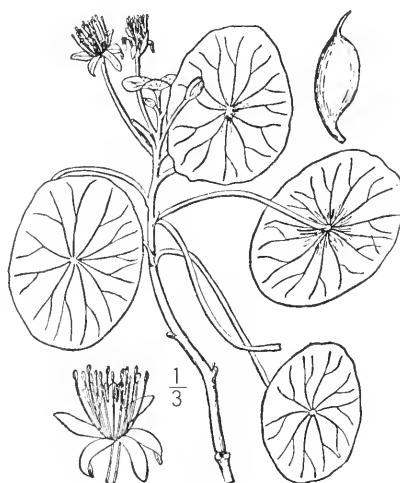
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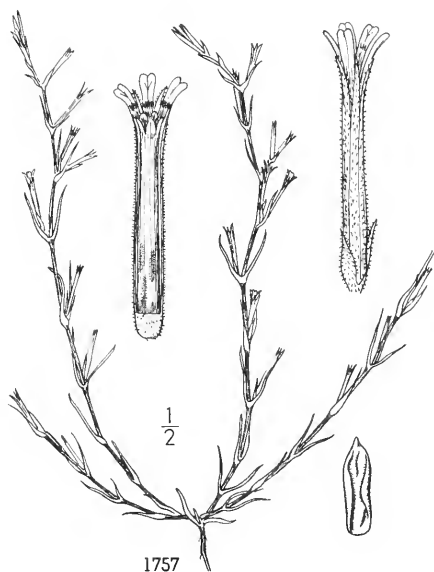
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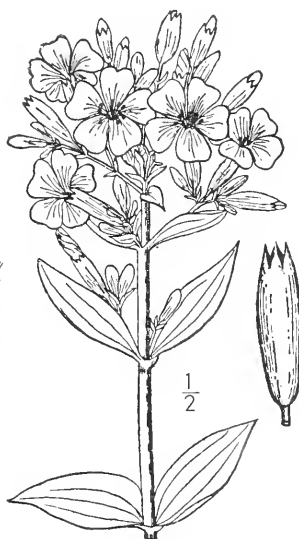
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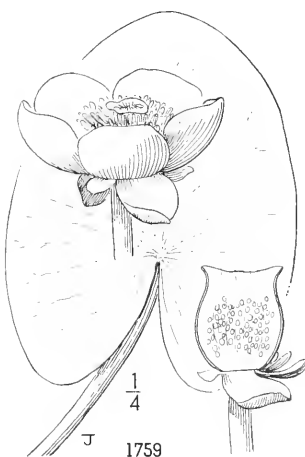
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1751. *Silene Suksdorfii*
 1752. *Lychnis alba*
 1753. *Lychnis Coronaria*

1754. *Vaccaria vulgaris*
 1755. *Dianthus Armeria*
 1756. *Saponaria officinalis*

1757. *Velezia rigida*
 1758. *Brasenia Schreberi*
 1759. *Nymphaea polysepala*

Family 45. **CERATOPHYLLACEAE.****HORNWORT FAMILY.**

Submerged aquatic plants with slender branching stems and verticillate dissected leaves. Flowers monoecious, solitary and sessile in the axils, subtended by 8–12-cleft calyx-like involucre. Perianth wanting. Stamens many, hypogynous, with short filaments; anthers appendaged with 2–3 sharp points. Pistil with a single carpel; style filiform; ovary 1-celled; ovule 1, pendulous. Fruit a nutlet, with a persistent style. Endosperm none; embryo straight, with the plumule well developed and bearing one or two whorls of filiform leaves.

Small family containing the single genus and three species.

1. **CERATOPHYLLUM** L. Sp. Pl. 992. 1753.

Characters of the family. [Name Greek, meaning horn and leaf.]

Two or three species, of wide geographic range. Type species, *Ceratophyllum demersum* L.

1. **Ceratophyllum demersum** L. Hornwort. Fig. 1760.

Ceratophyllum demersum L. Sp. Pl. 992. 1753.

Stems varying in length with the depth of the water up to 3 m. Leaves 5–12 in a verticil, dichotomously forked into filiform or linear often toothed segments; nutlets various, either smooth or tuberculate, the smooth either with or without a basal spur on each side, and the tuberculate either with a narrow spiny-toothed wing or with a broad entire wing.

Ponds and slow streams, Boreal and Austral Zones; common in the Pacific States and world-wide in its distribution. June–Aug. Several segregates have been proposed based upon the variations in the fruit.

Family 46. **RANUNCULACEAE.****CROWFOOT FAMILY.**

Annual or perennial herbs or rarely shrubs or woody climbers, with acrid colorless juice. Leaves alternate, or rarely opposite, simple or compound, exstipulate, but the base of the petiole often stipule-like. Pubescence when present composed of simple hairs. Flowers regular or irregular, hypogynous (except in *Paeonia*). Sepals 3–15, generally early deciduous, often petaloid, imbricate (valvate in *Clematis*). Petals present and of the same number as sepals, more numerous, or sometimes none. Stamens numerous, spirally arranged; anthers continuous with the filament. Carpels distinct, few to many, rarely solitary, 1-celled. Ovules one to many, anatropous. Fruit achenes, follicles or berries. Seeds with a hard endosperm, containing oil.

About 35 genera and 1100 species, widely distributed, but most abundant in the north temperate regions.

Carpels few- to several-seeded, becoming follicles or berries (*Actaea*) in fruit.

Sepals persistent; flowers large, solitary; petals broad.

1. *Paeonia*.

Sepals deciduous.

Flowers regular.

Leaves simple.

Petals none; sepals broad, petaloid; leaves reniform or cordate, not lobed.

2. *Caltha*.

Petals narrow; leaves palmately lobed.

3. *Trollius*.

Leaves compound.

Petals when present not spurred.

Flowers not racemose.

Petals none; sepals petaloid; leaves not evergreen.

4. *Isopyrum*.

Petals present, linear; leaves coriaceous, persistent.

5. *Coptis*.

Flowers racemose.

Racemes simple; fruit a berry.

6. *Actaea*.

Racemes usually compound; fruit a follicle.

7. *Cimicifuga*.

Petals spurred, showy.

8. *Aquilegia*.

Flowers irregular.

Upper sepal spurred; petals 4; the upper pair spurred and included in the spurred sepal.

9. *Delphinium*.

Upper sepal hooded; petals 2, clawed, inclosed in the hooded sepal.

10. *Aconitum*.

Carpels 1-seeded, becoming achenes.

Stem leaves whorled or opposite; sepals petaloid; petals none.

Stem leaves in a single involucre-like whorl; herbs; sepals imbricate.

Styles short, glabrous or pubescent.

11. *Anemone*.

Styles elongated and plumose.

12. *Pulsatilla*.

Stem leaves in pairs; woody vines; sepals valvate.
Stem leaves alternate.

Leaves not decomposed, mostly simple.

Petals present, rarely absent in *Ranunculus*.

Sepals spurred; diminutive annuals with elongated spike-like fruiting receptacle.

Sepals not spurred; petals with a nectary on the claw.

Petals absent; leaves palmately lobed.

Leaves ternately decomposed; flowers apetalous, usually dioecious.

13. *Clematis*.

14. *Myosurus*.

15. *Ranunculus*.

16. *Trautvetteria*.

17. *Thalictrum*.

1. PAEONIA [Tourn.] L. Sp. Pl. 530. 1753.

Perennial herbs or a few exotic species woody, with ternately or pinnately compound leaves and large showy flowers. Sepals 5 or 6, herbaceous and persistent. Petals 5 or 6, borne with the numerous stamens on a fleshy disk adnate to the base of the sepals. Style short or none; stigma crest-like, revolute, introrse. Follicles 2-5, thick and leathery, several-seeded. [Name in honor of Paeon, the physician of the gods.]

A genus of about 15 species, all but the following native of Eurasia. Type species, *Paeonia officinalis* L.

1. *Paeonia Bröwnii* Dougl. Western Peony. Fig. 1761.

Paeonia Bröwnii Dougl. ex Hook. Fl. Bor. Amer. 1: 27. 1829.

Perennial, somewhat glaucous herb, from thickened roots, the stems several, slightly fleshy, more or less decumbent, 2-4 dm. long. Leaves mostly basal, ternately or biternately divided, the divisions obovate; peduncles 2.5-5 cm. long; sepals orbicular, concave, 10-15 mm. long; petals orbicular, scarcely exceeding the sepals, brownish-red, thick and leathery; follicles usually 5, broadly oblong, smooth, 2-4 cm. long.

Rocky ridges, Hudsonian and Canadian Zones; eastern slopes of the Cascade Mountains and the Blue Mountains, southeastern Washington south through the Cascades and the Sierra Nevada to the mountains of southern California, east to Utah. Type locality: "Near the confines of perpetual snow on the subalpine range of Mount Hood," Oregon. June-July.

Paeonia Bröwnii subsp. *californica* (Nutt.) Abrams. (*Paeonia californica* Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 41. 1838.) Closely resembling the typical species, but the leaves larger and the segments linear-spatulate. Open chaparral or woods, Upper Sonoran Zone; foothills of southern California, from Monterey County to San Diego County.

2. CÁLTHA [Rupp.] L. Sp. Pl. 558. 1753.

Fleshy perennial herbs with simple leaves and showy, yellow, white or pink flowers. Sepals petaloid, large, deciduous. Petals none. Stamens numerous with short filaments. Carpels several to many, sessile; ovules numerous. Fruit follicles, dehiscent on the ventral suture; seeds numerous. [The Latin name for the marigold.]

A genus of 15 species, inhabiting swamps and wet meadows, widely distributed in the arctic and temperate regions. Type species, *Caltha palustris* L.

Stems leafy, decumbent; flowers yellow.

1. *C. asarifolia*.

Stems scapose or 1-leaved, erect; flowers white.

2. *C. biflora*.

Leaves reniform-orbicular, broader than long.

3. *C. leptosepala*.

Leaves cordate with a shallow sinus, longer than broad.

1. *Caltha asarifolia* DC. Yellow Marsh-marigold. Fig. 1762.

Caltha asarifolia DC. Syst. 1: 309. 1818.

Caltha palustris var. *asarifolia* Huth, Helios 9: 71. 1891.

Glabrous succulent perennial, the stems often rooting at the nodes. Leaves round-reniform, 5-8 cm. broad, crenate, the basal long-petioled, the upper shorter-petioled or sessile; flowers 1-3; sepals 5-7, bright yellow, 15-20 mm. long; follicles sessile, about 1 cm. long, slightly divergent at apex.

Swamps and wet meadows, Boreal Zones; Unalaska to western Oregon, mostly in the coastal region. Type locality: Unalaska. May-June.

2. *Caltha biflora* DC. White Marsh-marigold. Fig. 1763.

Caltha biflora DC. Syst. 1: 310. 1818.

Caltha malvacea Greene, Pittonia 4: 75. 1899.

Glabrous succulent perennial, the stems bearing a solitary leaf and usually 2 flowers. Leaves long-petioled, the blades round-reniform, usually broader than long, 5-8 cm. broad, crenate, the sinus open or often closed by the overlapping of the rounded lobes; sepals 6-9, mostly oblong-obovate, white; follicles distinctly stipitate when mature.

Mountain bogs, Boreal Zones; Alaska to the Olympic and Cascade Mountains of Washington and northern Oregon. Type locality: collected by Menzies on the mountains of the northwest coast. June-July.

Caltha biflora subsp. *Howellii* (Huth) Abrams. (*C. leptosepala* var. *Howellii* Huth, Helios 9: 68. 1891, *C. Howellii* Greene, Pittonia 4: 79. 1899.) Plants scapose, with the flowers solitary and the leaves rather obscurely repand-crenate. This subspecies replaces the typical species in the southern Cascades of Oregon and in the Sierra Nevada, California.

3. *Caltha leptosépala* DC. Slender-sepaled Marsh-marigold. Fig. 1764.

Caltha leptosepala DC. Syst. 1: 310. 1818.

Glabrous succulent perennial, the stems scapose and 1-flowered or bearing a solitary leaf or bract at the node and usually 2-flowered. Leaves cordate, varying from oblong-ovate to ovate-orbicular, longer than broad, the sinus usually open, and shallower than in the preceding species, repand-dentate to coarsely crenate; sepals 6–12, varying from oblong-ovate to oblong-linear, white; follicles somewhat diverging when ripe, 12–13 mm. long, short-stipitate.

Mountain bogs, Boreal Zones; Alaska south in the Cascade Mountains to Mount Hood, Oregon, eastward to Alberta, Montana, and New Mexico. Type locality: Prince William Sound, Alaska. June–July.

Caltha leptosepala var. *rotundifolia* Huth, Helios 9: 68. 1891. This is a large orbicular-leaved form occurring in the Rocky Mountains and Great Basin region and extending westward to the Blue Mountains, Oregon.

3. *TROLLIUS* L. Sp. Pl. 556. 1753.

Perennial herbs with thickened fibrous roots, glabrous herbage, erect or ascending stems. Leaves palmately divided or lobed. Flowers usually solitary, showy, yellow, purple or white. Sepals 5–15, petaloid, deciduous. Petals five to many, small, with a nectariferous gland at the base of the narrow blade. Stamens many. Carpels five to many; ovules many. Fruit a head of many-seeded follicles. [Name the latinization of the German *Troll* and *Trollblume*.]

A genus of about 15 species, natives of the north temperate zone. Type species, *Trollius europaeus* L.

1. *Trollius lálux* Salisb. American Globeflower. Fig. 1765.

Trollius lálux Salisb. Trans. Linn. Soc. 8: 303. 1803.

Trollius lálux var. *albiflorus* A. Gray, Amer. Journ. Sci. II. 33: 241. 1862.

Trollius albiflorus Rydb. Mem. N.Y. Bot. Gard. 1: 152. 1900.

Stems rather slender and weak, 2–5 dm. high, bearing 1 or 2 short-petioled leaves toward the summit. Basal leaves long-obovate, lobed and toothed; sepals ovate or obovate, greenish, yellow or nearly white, 15–20 mm. long; follicles 8–10 mm. long.

Swamps, Hudsonian Zone; British Columbia to New Hampshire, Washington (Olympic Mountains, northern Cascades and Wenatchee Mountains), Utah, and Delaware. Type locality: near Lancaster, Pennsylvania, June–Aug. The Western plants are usually white-flowered and have been considered as distinct by some botanists.

Nigélla damascéna L. Sp. Pl. 584. 1753. Love in the Mist. Glabrous annual with erect stems, 4–6 dm. high. Leaves pinnately and bipinnately divided into narrow subulate segments. Flowers terminal, showy, white or blue, subtended by conspicuous dissected bracts; sepals abruptly acuminate, clawed; styles elongated; mature follicles 15 mm. long and about half as broad, erect. Escaped from gardens and sparingly naturalized in Portland, Oregon.

4. *ISOPYRUM* L. Sp. Pl. 557. 1753.

Slender glabrous perennial herbs, with fleshy-fibrous roots and ternately decompound leaves. Flowers solitary, panicle or cymose, usually white. Sepals 5 or 6, petaloid, deciduous. Petals 5 or in our species none. Stamens many; filaments clavellate. Carpels 2–20, sessile or stipitate, several-ovuled. Fruit a head of follicles; seeds smooth with a prominent raphe. [Ancient Greek name for some *Fumaria*.]

About 25 species, natives of the north temperate zone; besides the following *I. biternatum* (Raf.) Torr. & Gray occurs in eastern North America. Type species, *Isopyrum thalictroides* L.

Flowers solitary, terminal or opposite the leaves.

Follicles sessile; sepals 7–9 mm. long.

Follicles stipitate; sepals 4–5 mm. long.

Flowers cymose-umbellate.

1. *I. occidentale*.

2. *I. stipitatum*.

3. *I. Hallii*.

1. *Isopyrum occidentale* Hook. & Arn. Western Rue-Anemone. Fig. 1766.

Isopyrum occidentale Hook. & Arn. Bot. Beechey 316. 1840.

Isopyrum occidentale var. *coloratum* Greene, Erythea 1: 125. 1893.

Enemion occidentale Drum. & Hutch. Kew Bull. 1920: 160. 1920.

Stem usually solitary, arising from fusiform or slightly thickened fasciculate roots, 10–25 cm. high. Basal leaf long-petioled; leaflets 1–2 cm. long, cuneate, 2–3-lobed; flowers scattered; peduncles surpassing the leaves; sepals white or pink, obovate; petals none; follicles 8–10 mm. long, compressed, 5–6-seeded.

On shady banks, usually under shrubs, Upper Sonoran and Arid Transition Zones; Sierra Nevada foothills from Butte County to Kern County, and in the Inner Coast Ranges from Santa Clara County to San Luis Obispo County, California. Type locality: California, collected by Douglas. March–May.

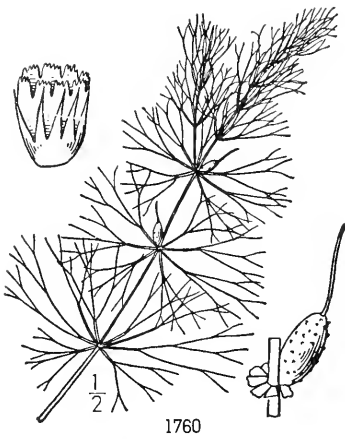
2. *Isopyrum stipitatum* A. Gray. Siskiyou Rue-Anemone. Fig. 1767.

Isopyrum stipitatum A. Gray, Proc. Amer. Acad. 12: 54. 1876.

Isopyrum Clarkei Kell. Proc. Calif. Acad. 7: 131. 1877.

Enemion stipitatum Drum. & Hutch. Kew Bull. 1920: 160. 1920.

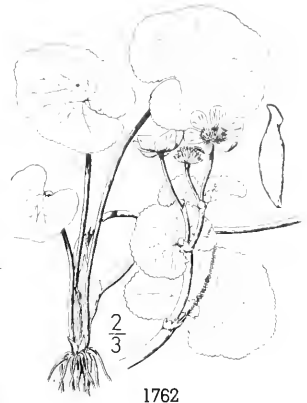
Stem arising from a fascicle of fusiform roots, 5–15 cm. high, often simple. Basal leaves



1760



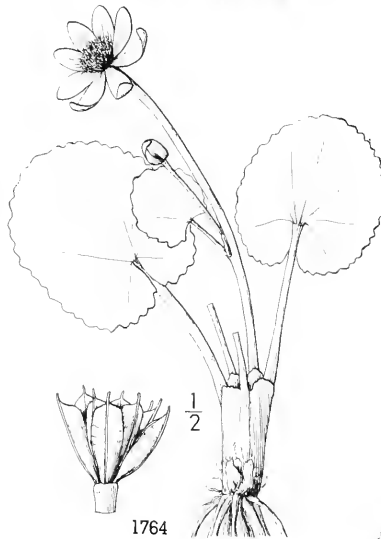
1761



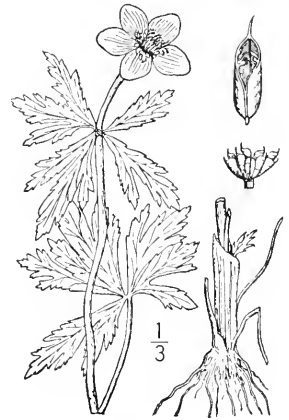
1762



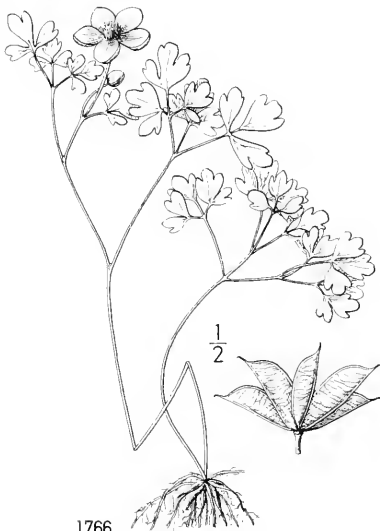
1763



1764



1765



1766



1767



1768

1760. *Ceratophyllum demersum*
 1761. *Paeonia Brownii*
 1762. *Caltha asarifolia*

1763. *Caltha biflora*
 1764. *Caltha leptosepala*
 1765. *Trollius laxus*

1766. *Isopyrum occidentale*
 1767. *Isopyrum stipitatum*
 1768. *Isopyrum Hallii*

long-petioled, about equaling the stems, 4–10 mm. long, leaflets entire or divided nearly or quite to the base into narrowly oblong or oblong-ob lanceolate divisions, glaucous; peduncle slender, scarcely equaling the leaf; flower solitary; sepals white or tinged with pink, 4–5 mm. long; filaments broadest near the middle; follicles 6–8 mm. long, distinctly stipitate, 3–5-seeded.

Edges of thickets, Transition Zone; near Oakland, Douglas County, Oregon, to the eastern edge of the Siskiyou Mountains and southward to Mendocino County, California. Type locality: near Yreka, California. Feb.–April.

3. *Isopyrum Hállii* A. Gray. Willamette Rue-Anemone. Fig. 1768.

Isopyrum Hallii A. Gray, Proc. Amer. Acad. 8: 374. 1872.

Enemion Hallii Drum. & Hutch. Kew Bull. 1920: 161. 1920.

Stems erect, arising from fasciculate fusiform roots, 3–10 dm. high. Basal leaves long-petioled; stem leaves usually two, leaflets 2–5 cm. long, broadly obovate-cuneate, deeply 3-lobed, the lobes several-toothed; flowers in 3–8-flowered terminal umbellate cymes; pedicels 2.5–3.5 cm. long; sepals white, 8–10 mm. long; stamens numerous, the filaments clavellate, very slender below; follicles 4–5, spreading, 4–5 mm. long; seeds 2–4, roughened.

Along mountain streams in deep woods, Humid Transition Zone; Coast Ranges and western slopes of the Cascade Mountains on both sides of the Willamette Valley, Oregon. Type locality: Oregon, exact station not known. June–July.

5. *CÓPTIS* Salisb. Trans. Linn. Soc. 8: 305. 1803.

Low glabrous scapose perennial herbs, with slender, yellow, bitter rootstocks. Leaves basal, long-petioled, the coriaceous and persistent blades compound or divided. Flowers solitary or few, terminal, white or tinged with green or yellow. Sepals petaloid, deciduous, in ours, narrowly ligulate. Petals narrowly ligulate, nectariferous near the middle. Stamens numerous. Carpels few, stipitate. Fruit an umbellate cluster of stipitate follicles. Seeds several, smooth and shining. [Name Greek, meaning to cut, in allusion to the divided leaves.]

About nine species, natives of the cool north temperate and subarctic regions of North America and Asia. Our species belong to the subgenus *Chrysocoptis*. Type species, *Coptis trifolia* (L.) Salisb.

Leaflets 3-lobed to about the middle.

Leaflets 3-parted nearly or quite to the base.

1. *C. occidentalis*.

2. *C. laciniata*.

1. *Coptis occidentális* (Nutt.) Torr. & Gray. Idaho Gold-thread. Fig. 1769.

Chrysocoptis occidentalis Nutt. Journ. Acad. Phila. 7: 8. 1834.

Coptis occidentalis Torr. & Gray, Fl. N. Amer. 1: 28. 1838.

Leaves basal, arising from the crown of a slender rootstock; petioles slender, 5–15 cm. long; leaflets 3, petiolulate, broadly ovate in outline, 2.5–5 cm. broad, 3-lobed to near the middle, the middle lobe again shallowly 3–5-lobed, serrate with rather abruptly mucronulate teeth; scape 10–15 cm. high, 2–3-flowered; peduncles 3–8 cm. long, longitudinally ribbed; sepals narrowly ligulate, 7–10 mm. long, 3-nerved, yellowish; petals narrowly ligulate above, nectariferous and somewhat enlarged near the middle, nearly filiform below; follicles 7 or 8, rarely fewer, 10–12 mm. long, smooth, on stipes about half as long.

Moist woods, Canadian Zone; eastern borders of Washington in Stevens County, and adjacent British Columbia, east to western Montana. Type locality: northern Idaho or western Montana. April–May.

2. *Coptis laciniàta* A. Gray. Oregon Gold-thread. Fig. 1770.

Coptis laciniata A. Gray, Bot. Gaz. 12: 297. 1887.

Closely resembling the preceding species. Leaflets a little narrower, 3-parted nearly or quite to the midrib, the lobes and serrations narrower and more acute; flowers and fruits essentially the same as in the preceding species.

Moist coniferous forests, mainly Humid Transition Zone; Skamania County, southwestern Washington, southward through the Coast Ranges to Mendocino County, California. Somewhat intermediate forms occur on the western slope of the Cascade Mountains, Oregon. Type locality: Oregon. March–April.

6. *ACTAËA* L. Sp. Pl. 504. 1753.

Erect, tall perennial herbs, with ternately compound leaves. Flowers small, white, in terminal racemes. Sepals 3–5, petaloid, fugaceous. Petals 4–10, small, clawed. Stamens numerous, with slender filaments and short anthers. Pistil solitary, many-ovuled; stigma broad, sessile. Fruit a red or white, somewhat poisonous berry. Seeds many, in two rows, horizontal. [The ancient Greek name of the elder.]

A genus of 6 species, natives of the north temperate zone. Besides the following, two other species occur in eastern North America. Type species, *Actaea spicata* L.

1. *Actaea argùta* Nutt. Western Red Baneberry. Fig. 1771.

Actaea arguta Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 35. 1838.

Actaea spicata var. *arguta* Torr. Pacif. R. Rep. 4: 63. 1856.

Stems rather stout, 4–8 dm. high, branching above, sparsely and minutely pubescent, sub-

tended at base by brownish sheaths. Leaves cauline, few, the lower petioled, the upper subsessile, ternate, the divisions pinnate, or the lowest leaflets again ternate; leaflets ovate to ovate-lanceolate, 3–8 cm. long, acuminate, irregularly and acutely toothed and incised; raceme usually short and congested in flower, 6–10 cm. long in fruit; petals shorter than the stamens with a small oblong-oval blade narrowed to a slender claw; fruiting pedicels 1–2 cm. long; berries red, oblong-ovoid, 6–8 mm. long.

Open woods in rich moist soil, Canadian and Humid Transition Zones; Alaska to central California, east to Montana and New Mexico. Resembling the Old World species *A. spicata* L. White-berried forms sometimes occur. Type locality: "Woods of the Oregon [Columbia] and its tributary streams." May–July.

7. *CIMICÍFUGA* L. Syst. Nat. ed. 12. 659. 1767.

Tall perennial herbs, with large decompose leaves. Flowers small, white, in terminal simple or paniculate racemes. Sepals 2–5, petaloid, deciduous. Petals 1–8, clawed, 2-lobed, or sometimes wanting. Stamens numerous; filaments filiform. Carpels 1–8, sessile or stipitate; ovules many. Fruit formed of 1–8 follicles. [Name Latin, meaning to drive away bugs.]

A genus of 10 species, inhabiting the cool temperate regions of North America and Eurasia. Type species, *Cimicifuga foetida* L.

Follicles stipitate; petals usually present; leaflets laciniately toothed.

1. *C. laciniata*.

Follicles sessile; petals none; leaflets coarsely serrate.

2. *C. elata*.

1. *Cimicifuga laciniata* S. Wats. Mount Hood or Cut-leaved Bugbane.

Fig. 1772.

Cimicifuga laciniata S. Wats. Proc. Amer. Acad. 20: 352. 1885.

Stems 1 m. high or more, glabrate. Leaves ample, 2–3-ternate, sparsely pubescent on the veins beneath; leaflets 3–6 cm. long, ovate to ovate-lanceolate, acuminate, incised and laciniately toothed; racemes panicled, pubescent; pedicels about 5 mm. long; petals 4–5 mm. long; follicles mostly 2–4, 6–7 mm. long, pubescent; stipes about half as long.

Shores of lakes and swamps, Canadian Zone; northern and western base of Mount Hood, Oregon. Type locality: Lost Lake, Hood River County, Oregon. August.

2. *Cimicifuga elata* Nutt. Tall Bugbane. Fig. 1773.

Cimicifuga elata Nutt. in Torr. & Gray, Fl. N. Amer. 1: 316. 1838.

Actaea elata Prantl, Bot. Jahrb. 9: 246. 1888.

Thalictrodes elatum Kuntze, Rev. Gen. Pl. 1: 4. 1891.

Stems 1–2 m. high, more or less pubescent and slightly glandular. Leaves 2–3-ternate, pubescent; leaflets 4–12 cm. long, ovate-orbicular in outline, deeply cordate, the lobes and teeth broad; racemes panicled; pedicels 1–5 mm. long; petals none; follicles commonly 1, varying to 2 or 3, subsessile, pubescent.

Open moist woods, Humid Transition and Canadian Zones; Clallam County, Washington, to Lane County, Oregon, mainly in the Coast Ranges. Type locality: "Shady woods of the Oregon." June–July.

8. *AQUILÈGIA* [Tourn.] L. Sp. Pl. 533. 1753.

Erect perennial herbs, with ternately decompose, mostly basal leaves and solitary, showy flowers terminating the branches. Sepals 5, regular, petaloid, deciduous. Petals 5, concave, prominently spurred at the base, the blade sometimes obsolete or very short. Stamens numerous, the inner ones reduced to staminodia. Carpels 5, sessile, many-ovuled. Fruit a head of follicles. [Name Latin, meaning eagle, the spurs suggesting the claws of the eagle.]

A genus of about 40 species, natives of the north temperate zone, and extending into the mountains of Mexico. Type species, *Aquilegia vulgaris* L.

Flowers nodding.

Flowers yellow, or the sepals occasionally pink; spur hooked at tip.

1. *A. flavescens*.

Flowers red or pink or the base and blades of the spurs yellowish.

Base of the spur not cut backward at the orifice, about 5 mm. broad.

2. *A. formosa*.

Base of the spur cut backward at the orifice, 8–10 mm. broad; leaves densely glandular-pubescent.

3. *A. eximia*.

Flowers erect, yellow or sometimes tinged with pink or purple.

4. *A. pubescens*.

1. *Aquilegia flavescens* S. Wats. Yellow Columbine. Fig. 1774.

Aquilegia flavescens S. Wats. Bot. King Expl. 10. 1871.

Aquilegia caerulea var. *flavescens* M. E. Jones, Contr. West. Bot. No. 8: 2. 1898.

Aquilegia canadensis subsp. *americana* var. *flavescens* Rapaices, Bot. Közlemények 8: 136. 1909.

Aquilegia formosa var. *flavescens* Frye & Rigg, Northwest Fl. 165. 1912.

Stems 2–7 dm. high, glabrous or sparsely pilose. Leaves biternate or the upper ternate; leaflets thin, glabrous or sparsely pubescent, 2–4 cm. long, 3-cleft, the divisions with rounded lobes; flowers wholly yellow or sometimes the sepals slightly tinged with scarlet; sepals lanceo-

late, 10–18 mm. long, exceeding the spur; lamina of the petals cream-colored, 5–8 mm. long; spur shorter than the sepals, usually incurved at the apex; follicles about 2 cm. long, pubescent.

Open woods, Arid Transition and Canadian Zones; British Columbia to eastern Oregon, east to Alberta, Wyoming, and Utah. Type locality: "Wasatch and Uintah Mountains," Utah. June–Aug.

2. *Aquilegia formosa* Fischer. Northwest Crimson Columbine. Fig. 1775.

Aquilegia formoso Fischer in DC. Prod. 1: 50. 1824.

Aquilegia canadensis var. *formosa* S. Wats. Bot. King Expl. 10. 1871.

Aquilegia columbiana Rydb. Bull. Torrey Club 29: 145. 1902.

Stems 5–10 dm. high, glabrous or sparingly pubescent. Leaves biternate; leaflets 2–4 cm. long, 2–3-cleft, the segments crenately lobed or toothed at the apex; sepals and spurs crimson; sepals ovate-lanceolate, acute or acuminate, about 2 cm. long; lamina of petals 6–10 mm. long, truncate or rounded, yellow; spur 12–18 mm. long, straight; follicles densely pubescent, erect, 20–30 mm. long.

Open woods, Transition and Canadian Zones; Alaska to northern and eastern California, Nevada, Utah, and Montana. Type locality: "In Kamchatka." June–Aug.

Aquilegia formosa var. *wawawensis* (Payson) St. John, Research Stud. St. Coll. Wash. 1: 97. 1929. (*A. wawawensis* Payson, Contr. U.S. Nat. Herb. 20: 145. 1918.) This is a form differing chiefly in the thinner leaves and light crimson or scarlet sepals and spurs. Along the banks of the Snake River, near Wawawai, Washington.

Aquilegia formosa var. *truncata* (Fisch. & Mey.) M. E. Jones, Zoe 4: 259. 1893. (*Aquilegia truncata* Fisch. & Mey. Ind. Sem. Hort. Petrop. 9: Suppl. 8. 1843; *A. californica* Lindl. Gard. Chron. 1854: 836. 1854; *A. hypolasia* Greene, Leaflets Bot. Obs. 2: 141. 1911; *A. adiantoides* Greene, op. cit.; *A. emarginata* Eastw. Leaflets West. Bot. 2: 7. 1937.) Closely resembling the species in general habit. Sepals and spurs scarlet, tinged with yellow; orifice of spur almost truncate, the lamina 1–3 mm. long; follicles 15–20 mm. long. Open woods and shady banks, Upper Sonoran to Canadian Zones; southern Oregon to northern Lower California and western Nevada. Type locality: Fort Ross, California.

Aquilegia formosa var. *pauciflora* (Greene) Payson, Contr. U.S. Nat. Herb. 20: 144. 1918. (*A. pauciflora* Greene, Leaflets Bot. Obs. 1: 76. 1904.) Leaves mostly basal and tufted; flowering stem scape-like, 2–3 dm. high, few-flowered; lamina of petal 2–3 mm. long. This is an alpine form of var. *truncata* inhabiting the higher altitudes of the Canadian and Hudsonian Zones of the Sierra Nevada, California.

Aquilegia mohavensis Munz, Leaflets West. Bot. 2: 66. 1938. This recently described species is closely related to *A. formosa* and probably only a variety of that polymorphic species. Leaves glabrous, nearly triternate, the leaflets being almost separate and small, 1.5–2.5 cm. long; sepals 7–8 mm. long, spreading, greenish yellow margined with red; spurs of the petals yellowish red, 13–15 mm. long, blade 3 mm. long, round-truncate; follicles about 15 mm. long. Desert ranges (New York Mountains), eastern Mojave Desert, California.

3. *Aquilegia eximia* Van Houtte. Van Houtte's Columbine. Fig. 1776.

Aquilegia eximia Van Houtte ex Planch, Fl. Serres II. 2: 15. 1857.

Aquilegia Tracyi Jepson, Fl. W. Mid. Calif. ed. 2. 165. 1911.

Plants glandular-puberulent throughout, the stems 5–10 dm. high. Basal leaves triternate; leaflets 2–4 cm. long, more or less glandular-pubescent, their teeth inclined to be obtuse instead of rounded; sepals about 15 mm. long, ovate-lanceolate, reflexed, scarlet; spurs scarlet below, tinged with yellow toward the orifice, 20–25 mm. long, 8–10 mm. broad at the orifice and sloping backward; lamina obsolete; follicles 15–20 mm. long.

Moist rocky banks, Upper Sonoran and Humid Transition Zones; California Coast Ranges from Mendocino County to San Mateo County. Type locality: not stated. April–Aug.

4. *Aquilegia pubescens* Coville. Coville's Columbine. Fig. 1777.

Aquilegia pubescens Coville, Contr. U.S. Nat. Herb. 4: 56. pl. 1. 1893.

Stems 2–3 dm. high, minutely pubescent throughout or glabrous below. Basal leaves ternate or biternate; leaflets 3–4 cm. long, with rounded lobes, glabrate to densely pubescent; stem leaves few; flowers erect, yellow throughout; sepals oblong, abruptly acute, 20–25 mm. long, spreading horizontally; spurs slender, straight, 3.5–4 cm. long; lamina 8–14 mm. long; follicles about 2 cm. long, pubescent.

Moist rocky soils, Boreal Zones; Sierra Nevada, mostly above 9,000 feet altitude, Mariposa County to Tulare County, California. Type locality: Mineral King, Tulare County, California. June–Aug.

9. DELPHINIUM L. Sp. Pl. 530. 1753.

Annual or perennial herbs with erect simple or branched stems, palmately lobed or divided leaves and showy irregular flowers. Sepals 5, petaloid, the upper one prolonged into a spur. Petals 2 or 4, the two upper spurred, the other two when present lateral and small. Pistils 1 or 3, sessile, many-ovuled, forming follicles in fruit.

A genus of about 126 species inhabiting the north temperate regions. Type species, *Delphinium Consolida* L.

Annual; pistil 1.

1. *D. Ajacis*.

Perennials; pistils 3.

Flowers red or yellow.

Flowers red or rose-colored.

Leaves divided into narrowly linear or lanceolate divisions; herbage and calyx puberulent.

2. *D. cardinale*.

Leaves divided into broad primary divisions.

Flowers rose-colored, often tinged with purple in drying; sepals widely spreading or reflexed.

3. *D. Purpusii*.

Flowers red; sepals only slightly spreading, never reflexed.

4. *D. nudicaule*.

Flowers yellow, sometimes tinged with rose or purple.

5. *D. luteum*.

Flowers blue or purple, or in some color forms pale pink or white.

Roots grumose-tuberiform, readily separating in age from the attenuated base of the stem.

Seeds smooth on the surfaces of the sides, more or less conspicuously winged at the summit and sometimes on the lateral angles.

Racemes loosely few-flowered (rarely over 8).

Follicles 15–20 mm. long, often arcuate-diverging; seeds with incurved wings at the summit, the lateral angles not winged or only slightly so above.

6. *D. Menziesii*.

Follicles 8–14 mm. long, only the tips diverging; seeds conspicuously white-winged on the lateral angles as well as the summit.

7. *D. depauperatum*.

Racemes rather strict with ascending pedicels, and more or less densely flowered, the flowers ranging from 7–20, rarely less than 8.

Leaves glabrous; inflorescence viscid-pubescent with spreading hairs.

8. *D. cynoreios*.

Leaves pubescent; inflorescence puberulent and somewhat viscid with very short upwardly curved appressed hairs.

9. *D. Nuttallii*.

Seeds more or less roughened on the surfaces, merely margined at the summit and on the lateral angles.

Flowers in a strict densely flowered raceme; pedicels equaling or shorter than the spur.

10. *D. strictum*.

Flowers in a loosely flowered raceme; pedicels spreading, the lower much exceeding the spur.

Seeds reticulate-rugose on the rounded back.

11. *D. oreganum*.

Seeds conspicuously tuberculate or sinuous-scaly.

12. *D. decorum*.

Roots elongated, simple or usually fasciculate, stout and woody or rarely somewhat fusiform, but never tuberiform; stems not attenuate at base.

Seeds scaly-roughened.

Leaves cuneate, glabrous, mostly deeply-lobed, the lobes entire or broader and toothed.

13. *D. uliginosum*.

Leaves not cuneate, pubescent, 5-parted, the segments narrowly lobed.

14. *C. Hansenii*.

Seeds not scaly-roughened.

Racemes lax, the lower pedicels elongated and spreading.

Plants 2–4 dm. high; leaves thickish, 2.5–5 cm. broad.

15. *D. bicolor*.

Plants tall, mostly 8–25 dm. high, often reclining below; leaves thinnish, the larger 10–15 cm. broad.

16. *D. trolliifolium*.

Racemes strict; pedicels erect or ascending, the lower but little exceeding the spurs, or rarely with one or two more elongated and leaf-bearing.

Plants tall, 8–25 dm. high, leafy; racemes usually elongated, often branched at the base.

Sepals violet-purple, spreading or recurved, 10–15 mm. long.

17. *D. scopulorum glaucum*.

Sepals greenish, often tinged with purple, erect, 6–8 mm. long.

Upper part of stem and inflorescence sparsely short-villous.

18. *D. californicum*.

Upper part of stem and inflorescence densely viscid-pubescent, with spreading yellowish hairs.

19. *D. viridescens*.

Plants 3–6 dm. high or rarely taller; leaves mainly basal.

Stems glaucous and glabrous or rarely very sparingly pubescent.

Follicles glabrous; seeds irregularly angled and narrowly wing-margined on the angles.

20. *D. Andersoni*.

Follicles puberulent; seeds completely surrounded by a loose white cellular coat, not winged.

21. *D. Parishii*.

Stems more or less densely puberulent or pubescent, not glaucous; seeds irregularly angled, more or less winged on the angles.

Seeds conspicuously winged on the angles.

Follicles glabrous.

22. *D. cuyamaca*.

Follicles puberulent.

Root-branches fasciculate and somewhat fusiform; flowers pale violet to lavender or white.

23. *D. hesperium*.

Root-branches not at all fusiform, usually elongated and more or less woody; flowers bright violet-purple.

24. *D. Parryi*.

Seeds narrowly winged or merely margined; sepals usually deep violet-purple, often 2 cm. long.

25. *D. variegatum*.

1. *Delphinium Ajacis* L. Rocket Larkspur. Fig. 1778.

Delphinium Ajacis L. Sp. Pl. 531. 1753.

Annual, finely pubescent, the stems branched, 2–4 dm. high. Leaves dissected into many narrowly linear segments, the lower petioled, the upper sessile or nearly so; flowers in simple or compound racemes, blue varying to pink or white, spur slender, about 2 cm. long; pistil 1; follicle pubescent.

Sparingly naturalized in the Pacific States. Native of Europe. May–Aug.

2. *Delphinium cardinale* Hook. Scarlet Larkspur. Fig. 1779.

Delphinium cardinale Hook. Bot. Mag. 11: pl. 4887. 1855.

Delphinium coccineum Torr. Pacif. R. Rep. 4: 52. 1857.

Delphinium flammeum Kell. Proc. Calif. Acad. 2: 22. 1863.

Plants with stout fascicled roots and hollow stems, 8–15 dm. high, branching above, puberulent throughout. Lower leaves 8–24 cm. broad, deeply parted into narrowly linear or

lanceolate lobes, these usually again divided, the upper similar but smaller; flowers many, in open racemes or panicles, bright scarlet, 25–40 mm. long, including the spur; sepals ovate, obtuse, 12–18 mm. long, the spur slender, 15–25 mm. long; petals yellow, tipped with scarlet, the upper pair with the lower lobe much shorter than the upper lobe, the lower pair with pilose ovate blades; follicles glabrous, 9–12 mm. long; seeds broadly truncate and winged at apex.

Hillsides and canyon slopes, Upper Sonoran Zone; Monterey County, California, to Lower California. Type locality: California, no definite station mentioned. May–July.

3. *Delphinium Purpusii* Brandg. Purpus' Larkspur. Fig. 1780.

Delphinium Purpusii Brandg. Bot. Gaz. 27: 444. 1899.

Delphinium roseum Heller, Muhlenbergia 2: 35. 1905.

Plants with a thick fascicled root and a stout hollow stem, 45–75 cm. high, simple or sparingly branched, glabrous or sparingly glandular-pilose. Leaves 6–8 cm. broad, 3–5-parted, with narrow sinuses and broad divisions with broad rounded or obtuse teeth or shallow lobes, pilose on the margins, otherwise glabrous and bright yellow-green; racemes rather strict, 5–14-flowered; pedicels ascending, equaling or longer than the spur; sepals rose-colored, spreading, elliptic, 15 mm. long, about equaling the spur; upper petals whitish, 7–8 mm. long, the lower rose-colored, obliquely ovate, split nearly to the middle; follicles glabrous, 12–20 mm. long; seeds with loose cellular covering.

Rocky slopes, Upper Sonoran and lower Arid Transition Zones; western slopes of the southern Sierra Nevada, in Tulare and Kern Counties, California. Type locality: Erskine Creek, Kern County, California. April–May.

4. *Delphinium nudicaule* Torr. & Gray. Red Larkspur. Fig. 1781.

Delphinium nudicaule Torr. & Gray, Fl. N. Amer. 1: 33. 1838.

Delphinium sarcophyllum Hook & Arn. Bot. Beechey 317. 1840.

Delphinium decorum var. *nudicaule* Huth, Helios 10: 33. 1892.

Delphinastrum nudicaule Nieuwl. Amer. Midl. Nat. 3: 172. 1914.

Plants with fascicled roots and rather slender naked or few-leaved glabrous stems, 3–6 dm. high. Lower leaves 3–10 cm. broad, deeply 3–5-parted, the divisions broad with rounded teeth or shallow lobes, rather fleshy, glabrous or sparsely pubescent, upper leaves reduced or wanting; raceme loose, simple or rarely branched, 3–12-flowered; pedicels spreading or ascending, at least the lower much longer than the flowers; sepals red, 10–14 mm. long, glabrous or nearly so, the spur 15–20 mm. long; upper petals yellow, tipped with red, the blade obliquely ovate, sharply bidentate at apex; lower petals scarcely half the size of the upper, 2-cleft; follicles 15 mm. long, glabrous; seeds winged on the truncate apex and the sides.

Open woods, Transition Zone; Josephine and Curry Counties, Oregon, to Mariposa and Monterey Counties, California. Type locality: California. March–June.

5. *Delphinium luteum* Heller. Yellow Larkspur. Fig. 1782.

Delphinium luteum Heller, Bull. S. Calif. Acad. 2: 68. 1903.

Delphinium nudicaule var. *luteum* Jepson, Man. Fl. Pl. Calif. 376. 1925.

Plants from a somewhat fleshy fusiform root, the stems simple or branched below, 3–4 dm. high, pubescent. Leaves 2–6 cm. broad, 3–5-parted, the divisions again lobed or toothed, with obtuse or acutish lobes or teeth, more or less pilose-pubescent; raceme open, usually over half the length of the stem, 2–12-flowered; pedicels much longer than the flowers; sepals yellow, sometimes tipped with rose or light purple, broadly ovate, 15 mm. long, rather densely pubescent, the spur stout, 15–18 mm. long; petals yellow, the upper entire or somewhat erose, the lower nearly as long, 2-cleft.

Bluffs along the coast, Humid Transition Zone; Sonoma and Marin Counties, California. Type locality: on grassy slopes about rocks near Bodega Bay, along the road leading to the village of Bodega. March–May.

6. *Delphinium Menziesii* DC. Menzies' Larkspur. Fig. 1783.

Delphinium Menziesii DC. Syst. 1: 335. 1818.

Delphinium pauperculum Greene, Pittonia 1: 284. 1889.

Stems arising from an irregular cluster of tubers, simple, 2–4 dm. high, more or less short-villous with spreading or somewhat reflexed hairs, varying to glabrous. Leaves 2.5–6 cm. broad, sparsely pubescent or glabrous, 5-parted, the segments cuneate in outline, commonly 3-lobed, the lobes oblong, rounded to acutish; raceme loosely 3–7-flowered or rarely more; sepals dark purple, obovate, 12–16 mm. long; spur stout, 12–15 mm. long, often recurved at the tip; upper petals white, veined with purple, entire or shallowly notched; lateral petals purple, 8–10 mm. broad, the lobes acute; follicles 12–20 mm. long, often arcuate-diverging, pubescent or glabrous; seeds with an incurved wing at the summit.

Grassy slopes, Canadian and Transition Zones; Vancouver Island and western British Columbia, to north-western California, and east to Montana and Colorado. Type locality: collected by Menzies, probably at Nootka Sound. April–June.

7. *Delphinium depauperatum* Nutt. Dwarf Larkspur. Fig. 1784.

Delphinium depauperatum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 33. 1838.

Delphinium pauciflorum var. *depauperatum* A. Gray, Bot. Gaz. 12: 54. 1887.

Stems simple, 1–3 dm. high, usually glabrous below, more or less viscid-pubescent above.

Leaves few, the basal 2–4 cm. broad, 5-parted, the primary divisions usually cuneate, with 2 or 3 oblong lobes, the stem leaves reduced and with oblong, obtuse divisions; flowers 2–8, rarely more, in loose racemes; sepals deep violet-purple, the spur slender, curved at the apex, about 12 mm. long; upper petals notched; follicles 8–14 mm. long, nearly straight, appressed viscid-puberulent; seeds rather conspicuously white-winged on the angles.

Mountain meadows and open coniferous forests, Boreal Zones; mountains of eastern Washington, to northern California, east to Idaho and Nevada. Type locality: "in the shade of pine woods in the Blue Mountains of the Oregon." June–Aug.

Delphinium Sönnlei Greene, *Pittonia* 3: 246. 1896. (*D. pauciflorum* var. *nevadense* A. Gray, *Syn. Fl. N. Amer.* 1st: 50. 1895. *D. pauciflorum* var. *Sönnlei* Smiley, *Univ. Calif. Pub. Bot.* 9: 190. 1921.) Closely related to *D. depauperatum* Nutt. and probably not specifically distinct, best distinguished by the more flabelliform leaves, more numerous flowers, glabrous inflorescence and follicles. Open coniferous forests and edges of meadows, Boreal Zones; Sierra Nevada, California. Type locality: above and below Truckee, California.

8. *Delphinium cyanoreios* Piper. Blue Mountains Larkspur. Fig. 1785.

Delphinium cyanoreios Piper, *Contr. U.S. Nat. Herb.* 16: 202. 1913.

Stems erect, arising from a thick tuber-like root, usually simple, 4–9 dm. high, puberulent or glabrate below, villous-glandular above, at least the inflorescence. Leaves few, the basal usually glabrous, their 3 cuneate divisions cleft into linear or linear-oblong segments, the upper smaller and more deeply cleft into narrower segments; racemes spiciform, 10–20-flowered; pedicels shorter than the spurs; calyx deep blue, sparsely short-villous, the spur straight, 12–14 mm. long; sepals oblong; upper petals white, tinged with blue; follicles villous-glandular, 1–2 cm. long, seeds smooth on the sides, the angles with narrow white margins.

Moist grassland, Arid Transition Zone; eastern Oregon, from the Blue Mountains to Klamath County, and eastward to adjacent Idaho. Type locality: near Sled Creek Ranger Station, Wallowa County, Oregon. May–July.

9. *Delphinium Nuttallii* A. Gray. Nuttall's Larkspur. Fig. 1786.

Delphinium Nuttallii A. Gray, *Bot. Gaz.* 12: 51, 54. 1887.

Delphinium columbianum Greene, *Erythea* 2: 193. 1894.

Stems strict and simple, 3–7 dm. high, puberulent throughout with recurved hairs, or glabrous. Leaves erect or ascending, 5–8 cm. broad, sparsely short-pubescent, 5-parted, the primary divisions divided to near the middle into 2 or 3 oblong, obtuse or acutish lobes. Raceme simple or with 1 or 2 branches, rather strict, many-flowered; pedicels ascending, the lower rarely over 3 cm. long; sepals light to rather deep blue, oblong-oval, 10–12 mm. long, the spur slender, straight, light blue, 15 mm. long; upper petals bluish, notched; lateral petals bright blue; follicles erect, only slightly divergent at the apex, 7–9 mm. long, pubescent; seeds winged on the margins.

Low moist ground, mainly Humid Transition Zone; British Columbia to middle western Oregon. Type locality: "Columbia Plains." June–July.

Delphinium leucophaeum Greene, *Erythea* 3: 118. 1895. (*D. willamettense* Suksdorf, *Deutsch. Bot. Monatt.* 16: 210. 1898.) Apparently only a color form of *D. Nuttallii* A. Gray, the flowers being yellowish with a slight tinge of blue in the veins or on the tips. Willamette Valley, Oregon.

10. *Delphinium strictum* A. Nels. Strict Larkspur. Fig. 1787.

Delphinium simplex Dougl. ex Hook. *Fl. Bor. Amer.* 1: 25. 1829. *Not. Salisb.* 1796.

Delphinium azureum var. *simplex* Huth, *Helios* 10: 34. 1893.

Delphinium strictum A. Nels. *Bull. Torrey Club* 27: 263. 1900.

Stems arising from short thick tuber-like roots, simple, erect and strict, 4–9 dm. high, puberulent below, viscid-pubescent above. Leaves usually many, on erect petioles, divided into linear to narrowly linear lobes, puberulent; raceme simple or rarely with one or two branches, spike-like, many-flowered; pedicels erect or nearly so, about equaling or shorter than the spurs; sepals oblong, obtuse, pale to deep blue, pubescent, the spur 12–15 mm. long, usually reflexed at the apex; follicles glandular-pubescent, 6–8 mm. long; seeds roughened on the sides.

Mountain meadows, Arid Transition Zone; eastern Washington and Oregon to Wyoming. Type locality: "On the subalpine range west of the Rocky Mountains, near the Columbia." May–July.

Delphinium strictum var. *distichiflorum* (Hook.) St. John, *Fl. S.E. Wash.* 153. 1937. (*D. simplex* var. *distichiflorum* Hook. *Lond. Journ. Bot.* 6: 67. 1847.) Leaves glabrous or nearly so; upper part of stem and inflorescence appressed-puberulent, scarcely viscid. Habitat and range of the species, and many intergrading forms occur.

11. *Delphinium oregonum* Howell. Oregon Larkspur. Fig. 1788.

Delphinium oregonum Howell, *Fl. N.W. Amer.* 1: 22. 1903.

Stems erect, simple or sparsely branched, 3–6 dm. high, puberulent with recurved hairs. Leaves long-petioled, spreading, 3–7 cm. broad, pubescent, 5-parted, the primary segments narrowly cuneate, the lobes oblong, acutish; raceme loosely 5–20-flowered, usually simple, the lower pedicels often 10 cm. long; sepals deep violet-purple, 12 mm. long, puberulent without, the spur straight or slightly curved, 15 mm. long; upper petals purple or tinged with purple, entire; lateral petals 8–10 mm. broad, dark blue, cleft at apex with a closed sinus and rounded lobes; follicles nearly straight, 8 mm. long, puberulent; seeds rugose-reticulate on the rounded back, the other surfaces smooth, narrowly winged at the summit, and margined on the lateral angles.

Grassland, Humid Transition Zone; western Oregon, from the Columbia Gorge to the Willamette Valley. Type locality: open plains and hillsides of the Willamette Valley. June–July. Color forms occur, with pinkish or yellowish white flowers, probably genotypes lacking the blue pigment or the blue and pink pigments.



1769



1770



1771



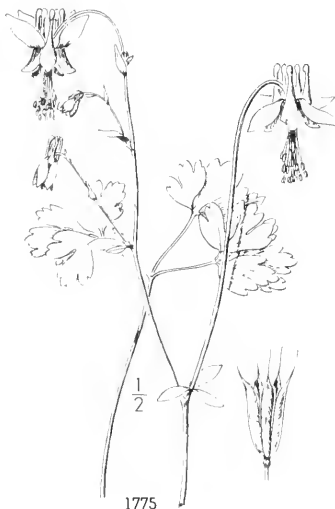
1772



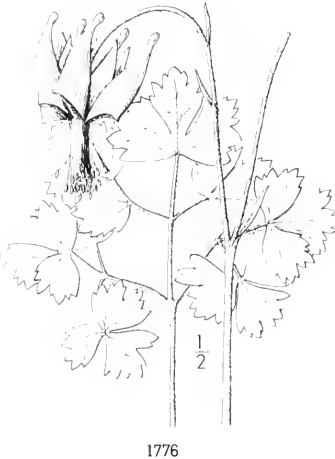
1773



1774



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1776



1777

1769. *Coptis occidentalis*
1770. *Coptis laciniata*
1771. *Actaea arguta*

1772. *Cimicifuga laciniata*
1773. *Cimicifuga elata*
1774. *Aquilegia flavescens*

1775. *Aquilegia formosa*
1776. *Aquilegia eximia*
1777. *Aquilegia pubescens*



1778



1779



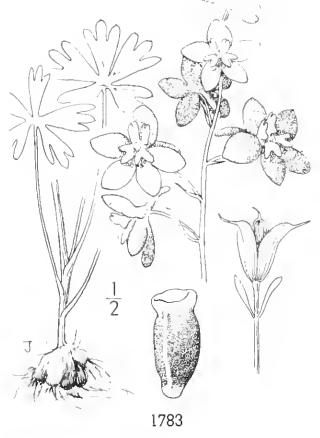
1784



1780



1782



1783



1781



1785



1786

1778. *Delphinium Ajacis*
 1779. *Delphinium cardinale*
 1780. *Delphinium Purpusii*

1781. *Delphinium nudicaule*
 1782. *Delphinium luteum*
 1783. *Delphinium Menziesii*

1784. *Delphinium depauperatum*
 1785. *Delphinium cyanoreios*
 1786. *Delphinium Nuttallii*

12. *Delphinium decorum* Fisch. & Mey. Coast Larkspur. Fig. 1789.

Delphinium decorum Fisch. & Mey. Ind. Sem. Hort. Petrop. 3: 33. 1837.

Delphinium decorum var. *racemosum* Eastw. Bull. Torrey Club 28: 671. 1907.

Stems from a globose tuber or fleshy root, usually solitary and simple, flexuous or erect, 1-4 dm. high, more or less grayish pubescent with short recurved hairs. Leaves 2-4 cm. broad, 3- or usually 5-parted, the segments oblong-elliptic and entire to cuneate and toothed or rather shallowly lobed, the teeth or lobes obtuse to rounded, upper leaves smaller and the segments narrower; raceme loosely 3-20-flowered, the lower pedicels elongated; sepals deep violet-purple, 15-20 mm. long, the spur 15 mm. long, rather stout and usually straight, pubescent; follicles 8 mm. long, somewhat divergent at the apex, glabrous; seeds merely margined on the angles, reticulate-roughened.

Bluffs and rocky hillsides, mainly Humid Transition Zone; coastal region from Mendocino County to Santa Cruz County, California. Type locality: Bodega Bay. March-May.

Delphinium decorum var. *pàtens* (Benth.) A. Gray, Bot. Gaz. 12: 54. 1887. (*Delphinium patens* Benth. Pl. Hartw. 296. 1848; *D. gracilentum* Greene; *D. Greenei* Eastw.) More slender than the typical species; racemes simple or compound, few-flowered; pedicels slender, usually glabrous; sepals violet-purple, 10-12 mm. long, narrowly elliptic, equaling the stout sparsely pubescent spur; follicles divergent, 9-10 mm. long, glabrous. Usually on partially shaded slopes in rich soil, Upper Sonoran Zone; Coast Ranges and western slopes of the Sierra Nevada to northern Lower California.

13. *Delphinium uliginosum* Curran. Swamp Larkspur. Fig. 1790.

Delphinium uliginosum Curran, Bull. Calif. Acad. 1: 151. 1885.

Delphinium decorum var. *uliginosum* Huth, Helios 10: 35. 1892.

Stems erect, from woody fibrous roots, 4-6 dm. high, glabrous or nearly so. Basal leaves 2-4 cm. broad, glabrous, cuneately flabelliform, 3-cleft, the segments entire, or commonly with 2 or 3 teeth; raceme strict, 3-12-flowered; pedicels shorter than the spur; sepals blue, 8-12 mm. long, the spur 12-15 mm. long, straight, sparsely pubescent; upper petals white with rounded violet tips, shallowly notched; lower petals violet, ciliate on the margin, and villous above; follicles slender, straight, 8-10 mm. long, puberulent; seeds densely clothed with minute blunt processes.

Margins of streams and swampy ground, Upper Sonoran Zone; North Coast Ranges, California. Type locality: swampy ground, almost in the water, Epperson's, Lake County, California. May-June.

14. *Delphinium Hansenii* Greene. Hansen's Larkspur. Fig. 1791.

Delphinium hesperium var. *Hansenii* Greene, Fl. Fran. 304. 1892.

Delphinium Hansenii Greene, Pittonia 3: 94. 1896.

Delphinium Hansenii var. *kernense* Davidson, Muhlenbergia 4: 37. 1908.

Stem simple, erect, from a fasciculately branching woody root, 4-8 dm. high, puberulent with recurved hairs. Leaves and petioles pubescent with spreading hairs, 2-5 cm. broad, 5-parted, the segments usually narrow, lobed and toothed; raceme strict, 6-40 cm. long; pedicels ascending, 1-2.5 cm. long; sepals dark violet-blue, or often bluish pink or nearly white, 6-8 mm. long, the spur stout, usually curved upward, about as long as the sepals, both it and the sepals minutely appressed-puberulent; upper petals white, violet above, notched or entire; lower petals violet, 3-4 mm. broad; follicles straight, 7 mm. long, puberulent to glabrate; seeds triangular, scaly-echinate, especially on the margins.

Rocky hillsides, Upper Sonoran Zone; foothills of the Sierra Nevada, from Butte County to Kern County, California. Type locality: Agricultural Station, Amador County. May-Aug.



1787. *Delphinium strictum*

1788. *Delphinium oregonum*

1789. *Delphinium decorum*

15. *Delphinium bicolor* Nutt. Flathead Larkspur. Fig. 1792.

Delphinium bicolor Nutt. Journ. Acad. Phila. 7: 10. 1834.

Root rather deep-seated, stout and fascicled, the stems stout, erect, 1-4 dm. high, sparsely pubescent or glabrous. Leaves orbicular in outline, rather thick, sparsely pubescent or glabrous, 2.5-5 cm. broad, 5-parted, the divisions more or less deeply lobed into narrowly oblong or linear, obtuse or rounded lobes; raceme loosely 2-12-flowered, lower pedicels elongated, spreading; sepals dark violet-purple, 12-15 mm. long, about equaling the stout spur; upper petals yellow, veined with purple, entire, lower petals purple, 8 mm. broad, with rounded lobes and a narrow sinus, often crenate on the margins; follicles nearly straight, 8-9 mm. long, viscid-pubescent or glabrous; seeds merely margined on the angles, or obscurely winged below, faintly reticulate on the lateral surfaces.

Open grassy slopes, usually in rocky soil, Canadian Zone; eastern slopes of the Cascade Mountains of Washington and Oregon to Saskatchewan, Wyoming, and Utah. Type locality: dry hills near Flathead River, Montana. May-Aug.

Delphinium glareosum Greene, Pittonia 3: 257. 1896. (*D. bicolor* var. *glareosum* Davis, Minn. Bot. Studies 2: 439. 1900.) This species, occurring on the Olympic Mountains at high altitudes, has been considered by some botanists as conspecific with *D. bicolor* Nutt., but in leaf shape, pubescence, and general habit it seems more closely related to *D. Menziesii* DC. Further material and field studies are necessary for final judgment.

Delphinium xantholeucum Piper, Centr. U.S. Nat. Herb. 11: 280. 1896. Resembling *D. bicolor* Nutt. but stouter, 6-8 dm. high; inflorescence very loose, glandular-pubescent; flowers pale yellow, the sepals greenish and viscid outside, 10-12 mm. long; follicles glandular-pubescent. Wenatchee, Chelan County, Washington.

16. *Delphinium trolliifolium* A. Gray. Poison Larkspur. Fig. 1793.

Delphinium trolliifolium A. Gray, Proc. Amer. Acad. 8: 375. 1882.

Delphinium exaltatum var. *trolliifolium* Huth, Helios 10: 35. 1892.

Delphiastrum trolliifolium Nieuwl. Amer. Midl. Nat. 3: 172. 1914.

Stems from a stout woody root, somewhat fistulous and reclining below, 6-15 dm. high, sparsely pubescent and slightly viscid, leafy. Leaves rather thin, the larger 10-15 cm. broad, orbicular or reniform in outline, 5-7-parted, the divisions cuneate, 3-cleft and laciniately lobed, the lobes acute to obtuse, lanceolate; racemes 10-30 cm. long, usually lax; pedicels diverging, at least the lower well exceeding the spur, viscid-villous; sepals violet-purple, 15-20 mm. long, broadly elliptic to ovate-lanceolate, obtuse or acute, nearly or quite glabrous, the spur 20-25 mm. long, stout and recurved; upper petals white or the tips tinged with purple, glabrous, lower petals purple, 8-10 mm. broad, villous toward the center; follicles 15-20 mm. long, usually arcuately recurved, glabrous; seeds usually with a narrow incurved wing on the truncate summit.

Moist ground usually in partial shade, Humid Transition Zone; western Oregon from the Columbia River, south through the Willamette Valley and the slopes bordering it, to Humboldt County, California. Type locality: Oregon, definite station not given. May-June.

17. *Delphinium scopulorum* var. *glaucum* (S. Wats.) A. Gray.

Glaucous Rocky Mountain Larkspur. Fig. 1794.

Delphinium glaucum S. Wats. Bot. Calif. 2: 427. 1880.

Delphinium scopulorum var. *glaucum* A. Gray, Bot. Gaz. 12: 52. 1887.

Stems from a stout woody root, 8-25 dm. high, glabrous and often glaucous, leafy. Leaves 8-15 cm. broad, glabrous or sparsely puberulent, 5-7-parted, the divisions cuneate, acutely incised and toothed, the central segment of each division prominent; raceme elongated, 10-45 cm. long, rather densely many-flowered, simple or with one or more branches below, the main axis glabrous or sparsely puberulent; pedicels ascending, scarcely equaling the spurs to a third longer, glabrous; sepals light to rather dark violet-purple, 8-12 mm. long, oblong-elliptic, the spur rather stout, equaling the sepals; upper petals notched, purple-tipped, the lower cleft; follicles 8-10 mm. long, nearly straight, glabrous or puberulent; seeds winged at the summit and sometimes on one lateral angle.

Mountain streams and meadows, Canadian and Hudsonian Zones; Alaska to southern California, east to Montana. Type locality: Big Tree Road, Sierra Nevada, California. June-Sept.

Delphinium scopulorum subsp. *occidentale* (S. Wats.) Abrams. (*D. clatum* var. *occidentale* S. Wats. Bot. King Expl. 11. 1871. *D. occidentale* S. Wats. ex Coult. Man. Bot. Rocky Mts. 11. 1885. *D. scopulorum* var. *alpinum* A. Gray, Bot. Gaz. 12: 52. 1887.) Closely resembling the variety *glaucum*, but the axis of the raceme, pedicels, and follicles conspicuously viscid-pubescent. Moist soil, Boreal Zones; British Columbia to the Siskiyou Mountains, southern Oregon, east to Colorado. Type locality: East Humboldt Mountains, Nevada.

Delphinium scopulorum var. *lupdorum* (Greene) Jepson, Fl. Calif. 523. 1914. (*D. luporum* Greene, Leaflets Bot. Obs. 1: 76. 1904.) Smaller than the preceding stems, 5-8 dm. high. Leaves 4-10 cm. broad, the central lobes of the divisions less elongated; pedicels, sepals and spurs short-villous; follicles densely pubescent; raceme rather lax, the flowers fewer and the pedicels considerably exceeding the spurs. Moist soils along streams and meadows, Boreal Zones; southern Sierra Nevada, California. Type locality: Coyote Creek, Kern County, California.

18. *Delphinium californicum* Torr. & Gray. Coast Larkspur. Fig. 1795.

Delphinium californicum Torr. & Gray, Fl. N. Amer. 1: 31. 1838.

Delphinium exaltatum var. *californicum* Huth, Helios 10: 35. 1892.

Stems arising from a thick woody root, stout, 6-20 dm. high, hollow, pubescent or glabrate, leafy. Leaves 5-15 cm. broad, pubescent or glabrate, 5-7-parted, the divisions cuneate, incisely

lobed and toothed; racemes usually dense or in robust plants more open and often branched; pedicels ascending, about as long as the spur or the lower sometimes more elongated, villous-pubescent to glabrate; sepals whitish more or less tinged with green and lavender, more or less densely short-villous, not recurved, 6-7 mm. long; spur stout, 6-8 mm. long; upper petals lobed, the upper lobe longer, villous, lower petals densely villous; filaments villous above; follicles erect, 10 mm. long, villous throughout, varying to glabrous.

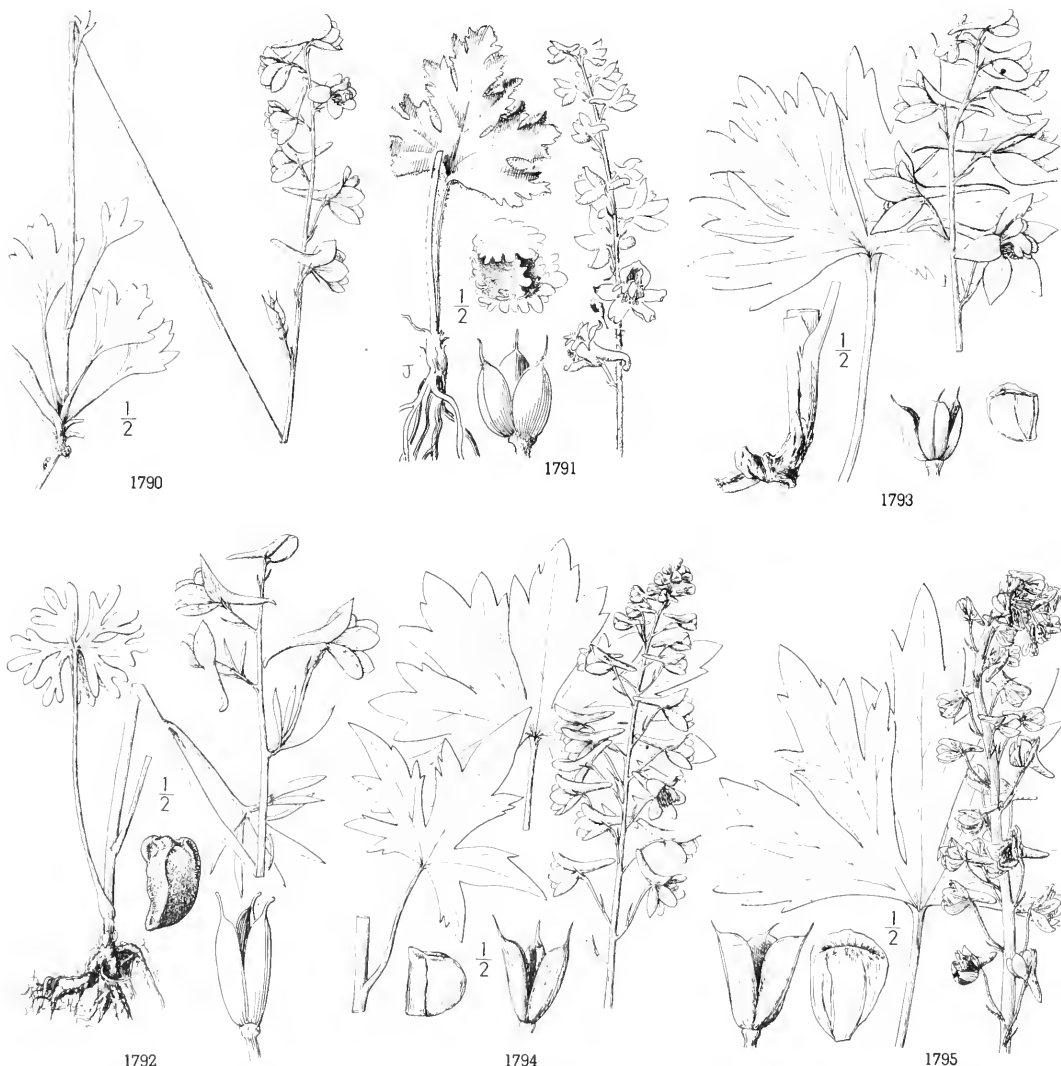
Partially shaded slopes and ravines, Upper Sonoran and Humid Transition Zones; California Coast Ranges, from Sonoma County to San Luis Obispo County. Type locality: California, collected by Douglas. April-June.

19. *Delphinium viridescens* Leiberg. Wenatchee Larkspur. Fig. 1796.

Delphinium viridescens Leiberg, Proc. Biol. Soc. Wash. 11: 39. 1897.

Stems arising from an elongated woody root, 8-15 dm. high, leafy, glabrate or puberulent below, densely viscid-pubescent with spreading yellowish hairs. Leaves semi-orbicular, 8-10 cm. broad, thinnish, glabrous or sparsely puberulent, 5-parted, the divisions cuneate, 3-lobed, the lobes linear-lanceolate, entire or often with a small narrow tooth; raceme elongated, 3-8 dm. long, very narrow and rather open, pedicels erect, 1-2 cm. long, densely pubescent and viscid with spreading yellowish hairs; sepals erect, 6-8 mm. long, green, tinged with brownish purple, the spur straight, 10 mm. long; upper petals glabrous, notched; follicles erect, 7 mm. long; seeds narrowly winged on the angles.

Wet meadows, Arid Transition and Canadian Zones; Wenatchee Valley, Washington. Type locality: near Peshastin, Chelan County. June-Aug.



1790. *Delphinium uliginosum*
1791. *Delphinium Hansenii*

1792. *Delphinium bicolor*
1793. *Delphinium trolliifolium*

1794. *Delphinium scopulorum*
1795. *Delphinium californicum*

20. *Delphinium Andersønii* A. Gray. Anderson's Larkspur. Fig. 1797.

Delphinium decorum var. *nevadense* S. Wats. Bot. Calif. 1: 11, in part. 1876.

Delphinium Andersonii A. Gray, Bot. Gaz. 12: 53. 1887.

Delphinastrum Andersonii Nieuwl. Amer. Midl. Nat. 3: 172. 1914.

Stems one to several, arising from a much fascicled usually elongated root, glaucous and glabrous, 2.5–6 dm. high. Leaves 2.5–4 cm. broad, thickish and glabrous, 5-lobed, the divisions narrow, 2–3-cleft, the lobes entire or with one or two teeth; petioles rather stout; raceme strict, 10–25 cm. long; pedicels ascending, glabrous, the lower 2–5 cm. long; bracts and bractlets sparsely villous; sepals deep violet-purple, 10–15 mm. long, sparsely villous-pubescent, the spur rather stout, slightly exceeding the sepals, recurved at tip; upper petals yellowish, tipped with violet, entire, lower petals purple; follicles erect, 12 mm. long, glabrous; seeds distinctly winged on the margins.

Dry hillsides and plains, Arid Transition Zones; southeastern Oregon to the eastern slopes of the Sierra Nevada, California, east to western Utah. Type locality: mountains of western Nevada. May–July.

21. *Delphinium Parishii* A. Gray. Parish's Larkspur. Fig. 1798.

Delphinium Parishii A. Gray, Bot. Gaz. 12: 53. 1887.

Delphinium colestinum Rydb. Bull. Torrey Club 39: 320. 1912.

Delphinium amabile Tidestrom, Contr. U.S. Nat. Herb. 25: 207. 1925.

Delphinium Parishii var. *pallidum* Munz, Bull. S. Calif. Acad. 31: 61. 1932.

Stems one or more, arising from a stout woody root, 3–6 dm. high, glaucous and glabrous or minutely and sparsely pubescent. Leaves more or less pubescent or rarely glabrate, 3–4 cm. broad, 3–5-parted, the divisions cuneate to narrowly cuneate, toothed or cleft into usually narrow lobes; racemes strict but rather open; pedicels ascending, 1–2 cm. long; sepals light blue or lavender, 6–10 mm. long, puberulent, the spur 10–12 mm. long, straight or slightly curved, puberulent; upper petals white or pale yellow, entire, lower petals blue; follicles sparingly short-pubescent, erect, 11–15 mm. long; seeds with a cellular coat, winged at the angles.

Desert washes and rocky slopes, Sonoran Zones; southern Nevada and Inyo County, California, south through the deserts to the western slopes of the San Jacinto Mountains, California, and east to southern Utah. Type locality: West Canyon, Palm Springs, California. April–June.

Delphinium subglobosum Wiggins, Contr. Dudley Herb. 1: 99. pl. 7. 1929. (*D. Parryi* var. *subglobosum* Munz.) Closely related to *Delphinium Parishii* A. Gray from which it differs chiefly in the deeper blue flowers and shorter and broader follicles and pubescent leaves. Desert slopes of the Cuyamaca and Laguna Mountains, San Diego County, California.

22. *Delphinium cuyamacae* Abrams. Cuyamaca Larkspur. Fig. 1799.

Delphinium cuyamacae Abrams, Bull. Torrey Club 32: 538. 1905.

Delphinium hesperium var. *cuyamacae* Jepson, Fl. Calif. 524. 1914.

Root stout, fasciculately branched, the branches not at all fusiform; stem erect, usually simple, rather stout and somewhat fistulous, 4–6 dm. high, cinereous-puberulent. Petioles of basal leaves stout, 6–9 cm. long, puberulent, the blades 2.5–3 cm. broad, dissected into broadly linear lobes, densely puberulent beneath; stem-leaves on closely erect petioles, similar to but smaller than the basal; raceme simple, narrow, densely flowered above; sepals purple, the spur straight, 3–4 mm. longer than the blades; follicles glabrous or essentially so; seeds irregularly angled and winged on the angles.

Open grassy slopes and meadows, Arid Transition Zone; Palomar and Cuyamaca Mountains, southern California. Type locality: Cuyamaca Lake, San Diego County, California. June–July.

23. *Delphinium hesperium* A. Gray. Western Larkspur. Fig. 1800.

Delphinium hesperium A. Gray, Bot. Gaz. 12: 53. 1887.

Stems arising from thick fleshy fibrous roots, erect, simple, 3–6 dm. high, puberulent or short-pubescent with recurved hairs. Leaves 2.5–3.5 cm. broad, usually pubescent, 5-parted, the divisions broadly oblong below, lobed and the lobes usually toothed; raceme strict and densely flowered, 5–20 cm. long, pedicels even the lowest less than 2 cm. long; sepals violet-purple varying to lavender, 8–12 mm. long, elliptic, usually densely puberulent in a broad median band, the spur slender, straight, a little exceeding the sepals; upper petals white, tinged with purple, rather obscurely notched, lower petals violet; follicles straight, 9–11 mm. long, puberulent; seeds with loose cellular coats forming wings on all the angles.

Open dry slopes and ridges, Upper Sonoran Zone; Humboldt and Shasta Counties south to San Luis Obispo and Kern Counties, California. Type locality: not definitely stated. April–June.

Delphinium hesperium var. *recurvatum* (Greene) Davis, Minn. Bot. Studies 2: 440. 1900. (*D. recurvatum* Greene, Pittonia 1: 235. 1889.) Distinguished by the narrower, linear-oblong, strongly recurved sepals, lavender or nearly white; plants usually with less pubescence. San Joaquin and lower Sacramento Valleys, California.

Delphinium hesperium var. *seditiosum* Jepson, Fl. Calif. 525. 1914. Leaves minutely puberulent, the segments very narrowly linear and more or less revolute. A dwarfed plant of the eastern slopes of the Santa Lucia Mountains, California.

24. *Delphinium Parryi* A. Gray. Parry's Larkspur. Fig. 1801.

Delphinium Parryi A. Gray, Bot. Gaz. 12: 53. 1887.

Delphinium Parryi var. *maritimum* Davidson, Muhlenbergia 4: 35. 1908.

Delphinium inflexum Davidson, Bull. S. Calif. Acad. 26: 70. 1927.

Stems arising from a stout woody fibrous root, simple or the raceme with one or two branches, 3–8 dm. high, puberulent. Leaves 2.5–4 cm. broad, 3–5-parted, the main divisions

narrow, deeply cleft and reclined into narrowly linear lobes, puberulent; raceme densely flowered and 6–15 cm. long, or often more elongated and the flowers more distant; pedicels ascending, 3 cm. long or less, or in the elongated open racemes often longer; sepals deep violet-purple, elliptic, 10–15 mm. long, rather thinly puberulent on the back, the spur straight, a little exceeding the sepals; upper petals white, tinged with purple, notched or entire, lower petals violet, often crenate; follicles straight to the divergent tips, 10–12 mm. long, puberulent; seeds with a loose cellular coat forming wings on the angles.

Dry hillsides and mesas, Upper Sonoran Zone; Monterey County, California, to Lower California. Type locality: San Bernardino County, California. April–June.

25. *Delphinium variegatum* Torr. & Gray. Royal Larkspur. Fig. 1802.

Delphinium variegatum Torr. & Gray, Fl. N. Amer. 1: 32. 1838.

Stems from short fasciated often fusiform roots, erect, simple or branched, 2–5 dm. high, usually hirsute-pubescent below, short-pubescent above. Leaves 2.5–4 cm. broad, 5-lobed, the divisions cleft and lobed into oblong-obtuse to linear-acute lobes; raceme simple or with one or two branches, usually less than 10 cm. long, pedicels ascending or somewhat spreading, short hirsute-pubescent; sepals broadly oval, 15–20 mm. long, deep violet-purple, rarely varying to pink, sparsely short-pubescent, the spur stout, scarcely equaling the sepals; upper petals white or yellowish, often tipped with purple, lower petals violet or rarely white; follicles erect, 12 mm. long; seeds very narrowly winged.

Grassy hillsides, usually in rocky soil, Upper Sonoran Zone, upper Sacramento Valley and Lake County, south to San Luis Obispo County, California. April–June.

Delphinium variegatum var. *apiculatum* Greene, Fl. Fran. 304. 1892. (*D. apiculatum* Greene, Pittonia 1: 285. 1889.) Flowers smaller, the sepals 10–15 mm. long, more numerous in a more elongated narrower raceme. This replaces the typical species throughout most of the foothill region surrounding the San Joaquin and the lower Sacramento Valleys, California.

10. *ACONITUM* [Tourn.] L. Sp. Pl. 532. 1753.

Erect, ascending or sometimes trailing herbs, with usually elongated stems, palmately lobed leaves, and large irregular flowers in racemes or panicles. Sepals 5, petaloid, the upper one hooded or helmet-shaped. Petals 2–5, the two upper hooded, long-clawed, concealed in the hooded sepal, the three lower, when present, minute. Stamens numerous. Pistils 3–5, sessile, many-ovuled, forming follicles in fruit. [The ancient Greek name.]

A genus of about 60 species, inhabiting the subarctic and cool temperate regions of North America and Eurasia. Type species, *Aconitum lycoctonum* L. The roots, and in some species the flowers also, poisonous.

1. *Aconitum columbianum* Nutt. Columbia Monkshood. Fig. 1803.

Aconitum columbianum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 34. 1838.

Plants usually tall and rather stout, 5–20 dm. high, glabrous below, pubescent or tomentose above and often a little viscid. Leaves 5–15 cm. broad, deeply 3–5-cleft, the divisions cuneate below, laciniately toothed and cleft; flowers in rather loosely flowered simple or few-branched racemes; hood 10–15 mm. long, the helmet portion higher than broad and in age much shorter than the narrowed lower portion, strongly beaked; follicles 10–15 mm. long.

Moist soil, Canadian Zone; British Columbia to the southern Sierra Nevada, California, east to Montana and New Mexico. In Washington and Oregon it is chiefly east of the Cascade Mountains. Type locality: "Springy places on the Oregon below Walla Walla." July–Aug. A variable species and a number of segregates have been proposed. (Greene in Rep. Nov. Spec. 7: 1–6. 1909.)

Aconitum bulbiferum Howell, Fl. N.W. Amer. 25. 1897. This species is based upon slender weak-stemmed plants with smaller leaves, and with most or in some cases all the flowers reduced to stalked or axillary bulblets. Plants of this type are not infrequent in the Cascade Mountains and in the Sierra Nevada, but according to the author's field observations they seem to be a mere state or form of *columbianum*, as all gradations can be found between them and the ordinary flowering form in the same communities.

Aconitum columbianum subsp. *pallidum* Piper in Piper and Beattie, Fl. S.E. Wash. 110. 1914. (*Aconitum gracilentum* Greene, Rep. Nov. Spec. 7: 1. 1909.) Flowers white or cream-colored with the edges sometimes tinged with purple. The common form in the higher altitudes of the Blue Mountains of Washington and Oregon.

11. *ANEMONE* L. Sp. Pl. 538. 1753.

Erect perennial herbs. Leaves compound or divided, all basal, except 2 or 3 forming an involucre subtending or remote from the flower. Peduncles 1-flowered, solitary or umbellate. Sepals 4–20, petaloid, and usually showy. Petals none. Stamens and pistils numerous. Fruit a head of numerous flattened ribless achenes, their styles short, glabrous or pubescent. [Name from the Greek, meaning a flower shaken by the wind.]

A genus of about 85 species widely distributed in the subarctic and temperate regions of both hemispheres. Type species, *Anemone coronaria* L.

Achenes densely woolly.

Stems from the simple or branching crown or a woody taproot.

Leaves simply ternate, the segments broadly cuneate or flabelliform.

Leaves 2–4-ternate, the segments linear to narrowly oblanceolate.

Styles rather stout, 1–3 mm. long.

Styles very slender, 4–6 mm. long.

Stems from a fusiform tuber.

Achenes not woolly; stems from horizontal rootstocks.

Involucral leaves simple.

Involucral leaves 3–5-foliate.

1. *A. parviflora*.

2. *A. globosa*.

3. *A. Drummondii*.

4. *A. tuberosa*.

5. *A. deltoideo*.

6. *A. quinquefolia* Grayi.

1. *Anemone parviflora* Michx. Northern or Small-flowered Anemone. Fig. 1804.

Anemone parviflora Michx. Fl. Bor. Amer. 1: 319. 1803.

Plants with slender rootstocks, the stems simple, one-flowered, 10–30 cm. high, sparingly villous. Basal leaves long-petioled, 3-parted, the divisions broadly cuneate and obtusely lobed or crenate, involucreal leaves sessile, their lobes similar but usually deeper; sepals oval, 5 or 6, 8–12 mm. long, white or tinged with purple without; fruiting head short-ovoid, about 1 cm. long; achenes densely villous all over or sometimes glabrate on the back.

Moist soils, Hudsonian and Arctic Alpine Zones; Alaska to Labrador, south Quebec, Wisconsin, and Colorado. Known from the Pacific States only from the Blue Mountains, eastern Oregon. Type locality: Hudson Bay region. July–Aug.

2. *Anemone globosa* Nutt. Globose Anemone. Fig. 1805.

Anemone multifida var. *globosa* Torr. & Gray, Fl. N. Amer. 1: 13. 1838.

Anemone globosa Nutt. ex Pritzl, Linnaea 15: 673. 1842.

Plants from stout rootstocks, the stems erect or ascending, 1–5 dm. high, soft-villous with long somewhat appressed hairs. Petioles of the basal leaves 5–12 cm. long, soft-villous; blades 4–10 cm. broad, 2–3 times ternately cleft, the ultimate divisions linear to narrowly lanceolate, more or less long-villous; involucreal leaves similar but short-petioled; peduncles 1–3; sepals varying from greenish yellow to pinkish or bluish purple, oval, 6–12 mm. long; head of fruit globose or ovoid; achenes densely villous.

Open forests or grassy slopes, often in rocky situations, Boreal Zones; Alaska to northern California, east to Saskatchewan, South Dakota, and Colorado. Type locality: "Plains of the Platte and Valleys of the Rocky Mountains in lat. 42°." June–July. This species is closely related to *Anemone hudsoniana* Richards. of northeastern North America, being distinguished chiefly by its larger flowers. *Anemone multifida* Poir. to which some botanists have referred it, is a native of southern South America and has small flowers and a coarser pubescence.

3. *Anemone Drummondii* S. Wats. Drummond's Anemone. Fig. 1806.

Anemone Drummondii S. Wats. Bot. Calif. 2: 424. 1880.

Stems arising from the crown of a stout woody root, 1–3 dm. high, soft-villous with spreading or somewhat appressed hairs. Basal leaves long-petioled, 3–6 cm. broad, villous, 3–4 times ternate, the ultimate segments linear; peduncles usually solitary; sepals oval, 8–10 mm. long, white and more or less tinged with blue; heads of fruit globose, about 10 mm. in diameter; achenes densely woolly; styles very slender, 4–6 mm. long.

Gravelly slopes, Hudsonian Zone; British Columbia to the central Sierra Nevada, California, east to Alberta and Idaho. Type locality: Sierra County, California. June–Aug.

4. *Anemone tuberosa* Rydb. Desert Anemone. Fig. 1807.

Anemone tuberosa Rydb. Bull. Torrey Club 29: 151. 1902.

Stems 1–3 dm. high, glabrous or nearly so below the involucre. Basal leaves with petioles 5–7 cm. long, glabrous, twice ternate, the cuneate divisions ternately cleft and toothed; involucreal leaves similar, but with longer lobes and teeth, short-petioled, and sparsely pubescent; peduncles 1 or 2, appressed-pubescent; sepals oblong-linear, 1–2 cm. long, white or purplish; head of the fruit ellipsoid; achenes densely woolly; styles filiform, 1.5 mm. long.

Rocky slopes, Sonoran Zones; Panamint and Providence Mountains, California, east to southern Utah and southern New Mexico. Type locality: Sierra Tucson, Arizona. March–April.

5. *Anemone deltoidea* Hook. Columbia Wind-flower. Fig. 1808.

Anemone deltoidea Hook. Fl. Bor. Amer. 1: 6. 1829.

Stems arising from very slender creeping rootstocks, 1–3 dm. high, glabrous or sparingly hirsute. Basal leaves usually solitary, long-petioled, 3-foliate; leaflets ovate, dentate, 3–5 cm. long; involucreal leaves 3, simple, ovate, dentate, subsessile, 4–7 cm. long; peduncles solitary; sepals white, broadly oval to obovate, 15–25 mm. long; achenes glabrous above, more or less short-hirsute toward the base.

Deep coniferous forests, Transition Zone; Pierce County, Washington, southward through western Oregon to Humboldt and Siskiyou Counties, California. Type locality: shady woods near the mouth of Columbia River. April–June.

6. *Anemone quinquefolia* var. *Grayi* (Behr & Kell.) Jepson. Western Wood Anemone or Wind-flower. Fig. 1809.

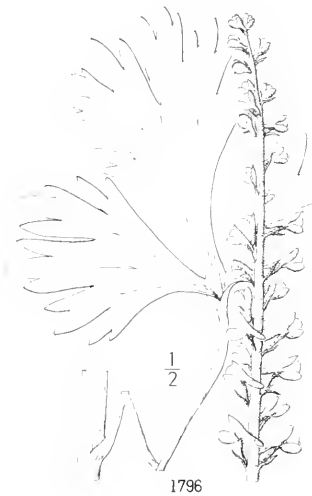
Anemone Grayi Behr & Kell. Bull. Calif. Acad. 1: 5. 1884.

Anemone nemorosa var. *Grayi* Greene, Fl. Fran. 295. 1892.

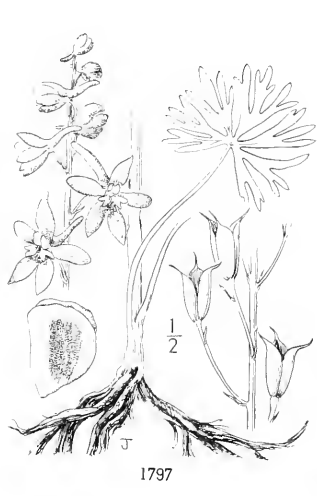
Anemone quinquefolia var. *Grayi* Jepson, Fl. W. Mid. Calif. 198. 1901.

Anemone oligantha Eastw. Proc. Calif. Acad. IV. 20: 142. 1931.

Stems arising from horizontal, somewhat thickened rootstocks, 1–3 dm. high, glabrous. Basal leaf on an elongated slender petiole, simple, trifid, usually wanting, involucreal leaves on petioles 15–40 mm. long; leaflets narrowly to broadly obovate, ovate, crenate-serrate above the cuneate base, 15–60 mm. long, sparsely appressed-pubescent on both surfaces; sepals white or



1796



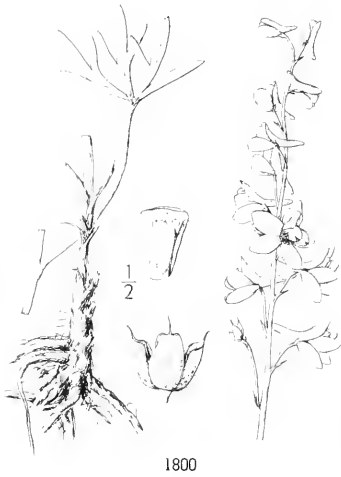
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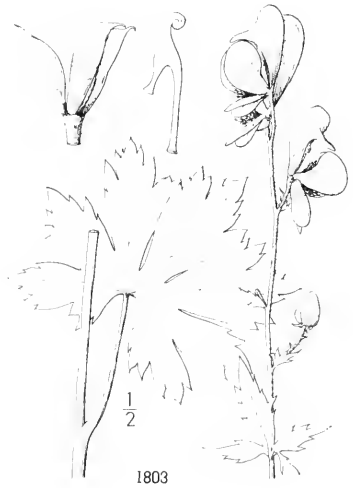
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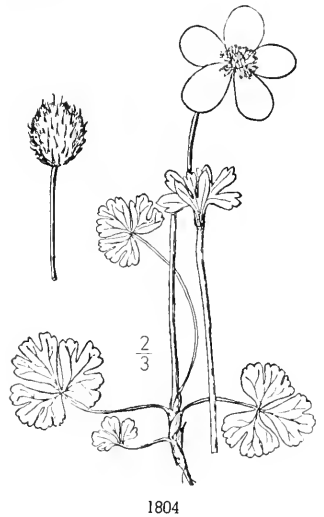
1801



1802



1803



1804

1796. *Delphinium viridescens*
1797. *Delphinium Andersonii*
1798. *Delphinium Parishii*

1799. *Delphinium cuyamaca*
1800. *Delphinium hesperium*
1801. *Delphinium Parryi*

1802. *Delphinium variegatum*
1803. *Aconitum columbianum*
1804. *Anemone parviflora*

sometimes tinged with purple, mostly elliptic-obovate, 8–15 mm. long; fruiting heads nodding, achenes hirsute-pubescent; styles scarcely 1 mm. long.

Shady woods, Transition Zone; Coast Ranges of southern Oregon to the Santa Cruz Mountains, California, extending inland to Siskiyou County. Type locality: California, but definite locality not given. April–May.

Anemone quinquefolia var. *oregona* (A. Gray) Robinson in A. Gray, Syn. Fl. N. Amer. 1st 13. 1895. (*A. oregona* A. Gray, Proc. Amer. Acad. 22: 308. 1887. *A. Adamsiana* Eastw. Proc. Calif. Acad. 20: 141. 1931. *A. Piperi* Britt. Bull. Torrey Club 29: 153. 1902.) Basal leaf usually present, trifoliate; sepals 10–20 mm. long, blue or pink or rarely white; head of fruit nodding. Shady woods, Transition Zone; Cascade Mountains, chiefly on the eastern slope in Washington and Oregon, extending to the Siskiyou Mountains where it shows marked variations in foliage, and seems to intergrade with the preceding variety.

Anemone quinquefolia var. *Lyallii* (Britt.) Robinson in A. Gray, Syn. Fl. N. Amer. 1st: 13. 1895. (*A. Lyallii* Britt. Ann. N.Y. Acad. 6: 227. 1891.) Basal leaf usually present, trifoliate; sepals only 4–6 mm. long, usually white, sometimes tinged with pink or blue; fruiting head nodding. Shady woods, Boreal Zones; Cascade Mountains, British Columbia to Oregon, also in the Olympic Mountains, Washington. This is probably only a small-flowered form of variety *oregona*.

12. PULSATILLA [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Scapose perennial herbs with stout rootstocks. Basal leaves long-petioled, palmately divided or compound; stem leaves 3, forming an involucre remote from the flower. Sepals petaloid. Petals none. Stamens numerous, the outer often sterile. Achenes numerous, forming a head in fruit and furnished with elongated persistent plumose styles. [Name Latin, unexplained.]

A genus of about 18 species, natives of the north temperate and subarctic regions. Type species, *Anemone Pulsatilla* L.

1. *Pulsatilla occidentalis* (S. Wats.) Freyn. Western Pasque-flower. Fig. 1810.

Anemone occidentalis S. Wats. Proc. Amer. Acad. 11: 121. 1876.

Pulsatilla occidentalis Freyn, Deutsch. Bot. Monatss. 8: 78. 1890.

Stems 1–6 dm. high, silky-villous. Basal leaves ternate, the silky-villous divisions twice pinnately dissected, the ultimate segments narrowly linear and acute; involucral leaves similar but smaller and short-petioled; sepals oval to oblong, 20–25 mm. long, white or tinged with purple; achenes villous, becoming reflexed in age; styles long-silky-plumose, 2.5–3 cm. long.

Gravelly or rocky slopes, Arid Transition and Boreal Zones; Alaska to the southern Sierra Nevada, California, east to Alberta and Montana. Type locality: "In the mountains from British Columbia southward to Mount Shasta and Lassen's Peak." June–Aug.

13. CLÉMATIS L. Sp. Pl. 543. 1753.

Erect perennial herbs or more commonly half-woody climbers. Leaves opposite, compound, with the petioles curved or twisted and aiding to climb. Flowers solitary or several, on axillary peduncles, perfect, dioecious or polygamo-dioecious. Sepals 4–5, petaloid, spreading or erect, valvate. Petals none, sometimes simulated by enlarged petaloid filaments of the outer stamens. Pistils and stamens many. Fruit a head of 1-seeded achenes, with elongated plumose styles. [Ancient Greek name for some climbing plant.]

A genus of about 170 species, of wide geographical distribution. Type species, *Clematis Vitalba* L.

Sepals and stamens erect, the former connivent at base or throughout; perennial herbs. (VIORNA)

1. *C. hirsutissima*.

Sepals and stamens spreading from the base; half-woody climbers.

Flowers white or yellowish, cymose-paniculate or when solitary the peduncle bibracteate. (FLAMMULA)

Ovaries and achenes pubescent.

Leaflets 5–7; inflorescence cymose-paniculate, usually many-flowered.

2. *C. ligusticifolia*.

Leaflets 3; inflorescence 1–3-flowered.

3. *C. lasiantha*.

Ovaries and achenes glabrous.

4. *C. pauciflora*.

Flowers blue or purple; peduncle 1-flowered, bractless. (ATRAGENE)

5. *C. columbiana*.

1. *Clematis hirsutissima* Pursh. Sugar Bowls, Hairy Leather-flower. Fig. 1811.

Clematis hirsutissima Pursh, Fl. Amer. Sept. 2: 385. 1814.

Clematis Douglasii Hook. Fl. Bor. Amer. 1: 1. 1829.

Viorna hirsutissima Heller, Mühlenbergia 1: 40. 1904.

Clematis Wyethii Nutt. Journ. Acad. Phila. 7: 6. 1834.

Erect perennial herb, 2–7 dm. high, the stems simple, solitary or several from the rootstock, sparsely to densely villous. Lowest leaves bract-like, entire, the rest 2–3-pinnate petioled, the ultimate divisions linear to linear-lanceolate; flower solitary on a naked peduncle, nodding in anthesis; sepals 4, erect except at the recurved tips, 3–4.5 cm. long, brownish purple, thick and leathery, densely villous without; achenes silky-pubescent, fruiting styles 5–6 cm. long.

Open grassy slopes, Arid Transition Zone; British Columbia southward east of the Cascade Mountains to Grant County, Oregon, and eastward to Montana and Wyoming. Type locality: "On the plains of the Columbia River." April–June. The leaves have the taste of strychnine, and Geyer, an early botanical explorer, reports that the Nez Perce Indians stimulated their fagged horses by rubbing the plant in their nostrils.

2. *Clematis ligusticifolia* Nutt. Western Virgin's Bower. Fig. 1812.

Clematis ligusticifolia Nutt. in Torr. & Gray, Fl. N. Amer. 1: 9. 1838.

Woody climber, the stems often 4-6 m. long, leaves pinnately 5-7-foliolate, lanceolate to ovate-lanceolate varying to ovate, rounded or somewhat cuneate at base, usually acuminate at apex, 3-8 cm. long, sparingly strigose; branches of the irregularly toothed or lobed inflorescence nearly erect; sepals oblanceolate, about 1 cm. long, white; filaments of the staminate flowers slender, those of the pistillate somewhat dilated and sterile; achenes pubescent with straight spreading or somewhat appressed hairs; styles 4-5 cm. long.

Stream banks, growing over bushes; Transition and Upper Sonoran Zones; British Columbia to central California, east to North Dakota and New Mexico. Type locality: "Plains of the Rocky Mountains." June-Sept. Yerba de Chivato.

Clematis ligusticifolia var. *brevifolia* Nutt. in Torr. & Gray, loc. cit. (*C. brevifolia* Howell, Fl. N.W. Amer. 8. 1897.) Leaflets ovate in outline, usually cordate at base, nearly or quite glabrous; branches of the inflorescence more spreading and shorter; sepals somewhat spatulate. This variety is the common form of eastern Washington and Oregon. Type locality: Blue Mountains, Oregon.

Clematis ligusticifolia var. *californica* S. Wats. Bot. Calif. 1: 3. 1876. (*C. biflora* Eastw. Bull. Torrey Club 32: 193. 1905.) Leaflets more or less densely silky-canescens on both surfaces. The common representative of the species in southern California.

Clematis suksdorfii Robinson, Syn. Fl. N. Amer. 1¹: 4. 1895. This species is closely allied to *C. ligusticifolia* var. *brevifolia* from which it differs chiefly in the somewhat smaller flowers and fruiting heads, and especially in the dense woolly tomentum of the achenes. It is known only from the vicinity of the type locality, and may be only a local variation. Originally collected by Suksdorf on the Klickitat River, Washington.

3. *Clematis lasiantha* Nutt. Chaparral Clematis or Virgin's Bower. Fig. 1813.

Clematis lasiantha Nutt. in Torr. & Gray, Fl. N. Amer. 1: 9. 1838.

Woody climber, the stems 2-4 m. long. Leaflets 3, mostly broadly ovate, 2.5-5 cm. long, coarsely toothed and somewhat 3-lobed, the teeth rounded; flowers polygamo-dioecious, solitary or 3-5 on bibracteate peduncles; sepals broadly oblong, about 3 cm. long, white; achenes pubescent, their styles 3 cm. long.

Hillsides, climbing over chaparral, Upper Sonoran Zone; Coast Ranges and foothills of the Sierra Nevada, northern California to northern Lower California. Type locality: San Diego, California. April-May.

4. *Clematis pauciflora* Nutt. Small-leaved Clematis or Virgin's Bower. Fig. 1814.

Clematis pauciflora Nutt. in Torr. & Gray, Fl. N. Amer. 1: 9. 1838. Not DC. 1828.

Clematis pauciflora Nutt. in Torr. & Gray, Fl. N. Amer. 1: 657. 1840.

A low woody climber with short-jointed stems, usually scrambling over chaparral. Leaves 3-5-foliolate; leaflets 1-2 cm. long, cordate to cuneate-obovate, usually 3-toothed or 3-lobed, glabrous or sparsely silky-tomentose; flowers dioecious, solitary or in few-flowered panicles with slender pedicels; sepals oblong-oblanceolate, 8-12 mm. long, thin, white; achenes glabrous.

On chaparral-covered hills and mesas, Upper Sonoran Zone; Los Angeles County, California, to northern Lower California. Type locality: San Diego, California. Feb.-May.

5. *Clematis columbiana* (Nutt.) Torr. & Gray. Columbia Clematis or Virgin's Bower. Fig. 1815.

Atragene columbiana Nutt. Journ. Acad. Phila. 7: 7. 1834.

Clematis columbiana Torr. & Gray, Fl. N. Amer. 1: 11. 1838.

Clematis verticillaris var. *columbiana* A. Gray, Syn. Fl. N. Amer. 1¹: 8. 1895.

Atragene grosseserrata Rydb. Bull. Torrey Club 29: 156. 1902.

Half-woody climber with slender stems. Leaves 3-foliolate; leaflets broadly ovate, usually obliquely cordate at base, acute or short-acuminate, 3-4 cm. long, entire or coarsely toothed, thin, glabrous or sparsely hirsute; flowers solitary on elongated bractless peduncles; sepals lanceolate, acuminate, 3-5 cm. long, purple or blue; achenes densely pubescent; styles 3-5 cm. long.

Deep forests, scrambling over bushes, Arid Transition and Canadian Zones; British Columbia southward east of the Cascades to the Blue Mountains, eastern Oregon, and eastward to Alberta, Colorado, and Utah. Type locality: Flathead River, Montana. May-Aug.

14. *MYOSÛRUS* L. Sp. Pl. 284. 1753.

Diminutive acaulescent annual herbs, with fibrous roots. Leaves basal, tufted, linear or linear-spatulate, entire. Flowers small, solitary on very short or more elongated scapes. Sepals 5, rarely 6-7, long-spurred at the base. Petals when present of the same number, greenish yellow, narrow, bearing a nectariferous pit at the summit of the claw. Stamens 5-25, about equaling the sepals. Pistils numerous borne on a cylindrical axis, which becomes greatly elongated and spike-like in fruit. Achenes apiculate or aristate. [Name Greek, meaning mouse-tail.]

A genus of about 8 species, usually of local occurrence, but of wide geographical distribution. Type species, *Myosurus minimus* L.

Mature achenes with beaks closely appressed; carpel-spike narrow, 15-45 mm. long.

Back of achene flat or depressed without lateral ridges, quadrate or rhomboidal.

Back of achene with a lateral submarginal ridge on each side, narrowly oblong.

1. *M. minimus*.

2. *M. lepturus*.

Mature achenes with prominent aristate more or less spreading beaks and salient laterally compressed carinate midribs.

Scapes slender; carpel-spikes 6–10 mm. long.

Mature achenes without a cup-like depression at base of beak.

3. *M. aristatus*.

Mature achenes with a cup-like depression at base of beak.

6. *M. cupulatus*.

Scapes none or stout.

Carpel-spikes sessile or subsessile; beaks ascending, straight; body of the achenes without a broad cellular margin.

4. *M. sessilis*.

Carpel-spikes on a stout scape; beaks conspicuous, usually curved and spreading; body of the achene with a conspicuous cartilaginous margin.

5. *M. alopecuroides*.

1. *Myosurus minimus* L. Common Mouse-tail. Fig. 1816.

Myosurus minimus L. Sp. Pl. 284. 1753.

Myosurus Shortii Raf. Amer. Journ. Sci. 1: 379. 1819.

Myosurus major Greene, Pittonia 3: 257. 1898.

Leaves narrowly linear or filiform, blunt, 3–10 cm. long; scape 3–15 cm. long; sepals oblong, about 3 mm. long; spurs slender, 1–2 mm. long; petals narrowly spatulate, sometimes wanting; fruiting spike 3–5 mm. long, 2–2.5 mm. thick.

Moist places, Upper Sonoran and Transition Zones; a cosmopolitan species probably composing several geographic races. On the Pacific Coast ranging from British Columbia to Lower California. Type locality: Europe. April–May.

Myosurus minimus var. *apus* Greene, Bull. Calif. Acad. 1: 277. 1885. Flowers and fruit sessile or on very short scapes, exceeded by the leaves. Mesas back of San Diego, California.

2. *Myosurus lepturus* (A. Gray) Howell. Slender Mouse-tail. Fig. 1817.

Myosurus apetalus var. *lepturus* A. Gray, Bull. Torrey Club 13: 2. 1886.

Myosurus lepturus Howell, Fl. N.W. Amer. 1: 12. 1897.

Myosurus tenellus Greene, Pittonia 3: 258. 1898.

Leaves filiform or nearly so, 2–6 cm. long; scapes rather slender, 5–15 cm. long; sepals linear-oblong, 1.5–2 mm. long; petals narrowly linear, about equaling the sepals or wanting; spurs scarcely 1 mm. long; fruiting spike 1.5–5 cm. long, 1.5–2 mm. thick toward the base and gradually tapering to the apex; back of achenes narrowly oblong and narrowed at both ends, more or less distinctly nerved toward the margins and grooved between these and the rather flattened keel; beak very short.

Moist ground, especially on the bottoms of desiccated pools, Upper Sonoran Zone; British Columbia, Washington, Oregon, and northern California, east to Saskatchewan and Montana. Type locality: California. April–May.

Myosurus lepturus var. *filiformis* Greene, Bull. Calif. Acad. 1: 277. 1885. More slender than the type; fruiting spike scarcely over 1 mm. thick at base, very slightly tapering if at all; achenes with keel and marginal nerves and beak as in the typical species, but proportionately broader and less than 1 mm. long. Desiccated pools and alkali flats, mainly Lower Sonoran Zone: Sacramento Valley, California, south to Guadalupe Island, Lower California. Type locality: Guadalupe Island.

3. *Myosurus aristatus* Benth. Sedge Mouse-tail. Fig. 1818.

Myosurus aristatus Benth. ex Hook. Lond. Journ. Bot. 6: 458 bis. 1847.

Leaves narrowly linear or somewhat spatulate, 2–5 cm. long; scapes very slender, 2–8 cm. long; sepals oblong, 1.5 mm. long, erect; spurs equaling the blades; petals present or none; fruiting spike 5–10 mm. long, remaining light green in drying; backs of achenes sharply keeled on the back and with a marginal nerve on either side; beak about as long as the body and more or less recurved-spreading.

Low moist places, mainly Transition Zone; British Columbia to southern California, east to Nebraska and New Mexico. Type locality: Camass Prairie, Idaho. April–May. This species has been referred by some botanists to *M. apetalus* Gay of Chile.

4. *Myosurus sessilis* S. Wats. Sessile Mouse-tail. Fig. 1819.

Myosurus sessilis S. Wats. Proc. Amer. Acad. 17: 362. 1882.

Leaves 2–3 cm. long, narrowly linear; scapes several and spreading, short, usually 5 mm. long or less; petals 3.5 mm. long; fruiting spikes 15–25 mm. long, spreading and somewhat curved, 2 mm. thick near the base, gradually tapering to the acute apex; beaks appressed, straight; fruiting carpel keeled on the back and without cellular thickening.

Saline flats, Sonoran Zones; Umatilla County, Oregon, south to Lower California. Type locality: alkaline flat, seven miles south of Arlington, Oregon. April–May.

5. *Myosurus alopecuroides* Greene. Bristly Mouse-tail. Fig. 1820.

Myosurus alopecuroides Greene, Bull. Calif. Acad. 1: 278. 1885.

Leaves narrowly linear-spatulate, 3–4 cm. long; scapes stout, 6 mm. long; fruiting spikes 8–20 mm. long, 3–4 mm. thick at base, tapering to the apex; beak spreading and more or less curved, extending down the back of the carpel as a prominent strongly laterally compressed keel; body of the carpel somewhat quadrate with a cellular scarious body and an oblong cellular thickened border; seed oblong-ovoid.

Desiccated winter pools and flats of alkaline soils, Sonoran Zones; Sacramento and San Joaquin Valleys, California. Type locality: Antioch, California. April–May.



1805. *Anemone globosa*
 1806. *Anemone Drummondii*
 1807. *Anemone tuberosa*

1808. *Anemone deltoidea*
 1809. *Anemone quinquefolia*
 1810. *Pulsatilla occidentalis*

1811. *Clematis hirsutissima*
 1812. *Clematis ligusticifolia*
 1813. *Clematis lasiantha*

6. *Myosurus cupulatus* S. Wats. Arizona Mouse-tail. Fig. 1821.

Myosurus cupulatus S. Wats. Proc. Amer. Acad. 17: 362. 1882.

Leaves narrowly linear; scapes slender, often 6–8 cm. long; fruiting spikes slender, up to 5 cm. long; achenes rounded, the thickened portion forming a dorsal cup-like depression around the base of the slightly spreading much flattened subulate beak.

Hills and mountains, Sonoran and Transition Zones; Arizona and New Mexico, also locally in the Providence and Little San Bernardino Mountains, southern California. Type locality: "hills between the Gila and San Francisco Mountains" and "on the Santa Catalina Mountains, at 8,000 feet altitude." March–April.

15. **RANUNCULUS* L. Sp. Pl. 548. 1753.

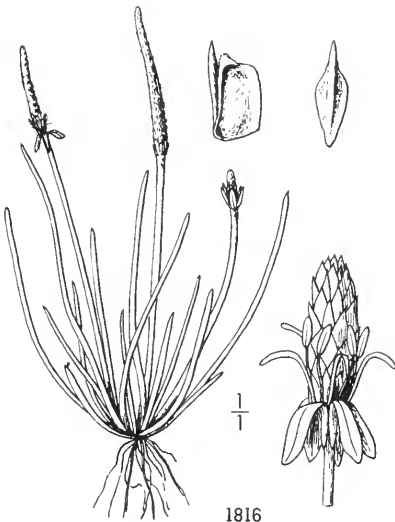
Glabrous or hairy annual or perennial herbs with fibrous, fascicled roots. Stems pro-cumbent and rooting at the nodes or erect, 0.5–12 dm. long, branching or simple, obscurely or obviously fistulose. Basal leaves entire or 3-lobed, -parted, or -divided, or pinnately compound, the petioles dilated at the base; cauline leaves alternate or rarely opposite. Flowers from terminal buds. Sepals 5, deciduous, or rarely marcescent-persistent, 2–20 mm. long. Petals yellow or sometimes white or rarely red, often fading to white in age,



1814



1815



1816



1817

1814. *Clematis pauciflora*

1815. *Clematis columbiana*

1816. *Myosurus minimus*

1817. *Myosurus lepturus*

* Text of the genus *Ranunculus* contributed by Lyman Benson.

1-16, 2-35 mm. long, having a usually short claw, provided at the base of the blade with a nectariferous pit usually covered by a scale, the blade rarely reduced. Stamens 10 to many, very rarely fewer. Pistils 5 to many, the single ovule attached near the base of the cell. Achenes capitate or spicate; turgid or flattened; smooth, papillate, or echinate, striate, or with transverse ridges on the faces; glabrous or hairy; nearly always tipped with an elongated beak; coat firm and strong, or sometimes thin and loose, rarely utricular. [Name diminutive of *Rana*, Latin for frog. Applied by Pliny because the majority of species grow in marshy or wet places where frogs are abundant.]

Species about 250, in nearly all frigid and temperate regions and in the mountains in the tropics. Type species, *Ranunculus acris* L.

Achenes or utricles not transversely ridged (except in typical *R. sceleratus* of the Section *Hecatonia*); petals usually glossy, yellow or rarely red, white, or greenish; commonly palustrine or terrestrial.

Sepals deciduous during or soon after anthesis; fruits not utricular; petals yellow or rarely white or greenish or dorsally red.

Pericarp not striate or nerved, thick and firm (Subgenus *Euranunculus*).

Leaves (either the cauline or the basal) lobed, parted, or divided.

Achenes smooth, sometimes hairy.

Styles and achene beaks present, the achene not corky-keeled and not with corky thickening on the margin of the body; nectary scale ventral to the nectary, covering it, apically truncate or rounded.

Nectary scale free laterally for at least two-thirds its length, not forming a pocket; dorsoventral measurement of the achene 3-15 times the lateral; receptacle in fruit (in most species) elongated only 1-3 times its length in anthesis; sepals usually not lavender- or purple-tinged.

I. CHRYSANTHE.

Nectary scale attached to the petal laterally and forming a pocket; dorsoventral measurement of the achene 1-2.5 times the lateral; receptacle in fruit 3-15 times its length in anthesis; sepals always tinged dorsally with purple or lavender.

III. EPIROTES.

Styles and achene beaks practically lacking or otherwise the achene with a corky keel or with corky thickening on the margin of the body; nectary scale with the gland in a pocket on its ventral surface or else the scale forked and prolonged anteriorly on the surface of the petal or surrounding the gland; aquatic or palustrine.

V. HECATONIA.

Achenes covered with spines, hooks, or papillae or with papillae produced into hooked hairs; dorsoventral measurement of the achene 3-6 times the lateral; receptacle in fruit 1-3 times its length in anthesis.

II. ECHINELLA.

Leaves (both cauline and basal) entire, dentate, serrulate, or wavy; dorsoventral measurement of the achene not more than twice or thrice the lateral.

IV. FLAMMULA.

Pericarp striate, the nerves 3 or more on each face, these sometimes branched, ovary wall thin and usually fragile (Subgenus *Cyrtorhyncha*).

Petals larger than the sepals; fruiting receptacle elongated to several times its length in anthesis, cylindrical or long-ovoid; nectary scale overarched the nectary, truncate, the margins free from the blade of the petal; stolons present.

VI. HALODES.

Petals smaller than the sepals; receptacle but slightly elongated in fruit, not cylindrical; nectary scale forming a pocket, forked, its lateral margins attached to the blade of the petal; stolons never present.

Sepals yellow; blades of the petals 7-8 mm. long, yellow.

VII. ARCTERANTHIS.

Sepals white; blades of the petals 1-3 mm. long, yellowish or greenish.

VIII. PSEUDAPHANOSTEMMA.

Sepals persistent in fruit; fruit utricular; petals red on both sides (Subgenus *Crymodes*).

IX. EUCRYMODES.

Achenes roughly transversely-ridged; petals not glossy, white, the claws sometimes yellow; aquatic plants (Subgenus *Batrachium*).

X. EUBATRACHIUM.

I. CHRYSANTHE.

Fruiting receptacle not more than twice as long as the flowering.

Receptacle glabrous.

Sepals spreading.

Stems not rooting; leaves appearing palmately 5-parted by the forking of the two lateral lobes.

1. *R. acris*.

Stems rooting at the nodes; leaves obviously 3-lobed, -parted, or -divided.

2. *R. repens*.

Sepals reflexed.

Stem base a conspicuous, bulb-like subterranean thickening.

3. *R. bulbosus*.

Stem base not bulbous.

Petals large and conspicuous, at least twice the length of the sepals.

Achenes 3.5 or commonly 4-5 mm. long; petal blades 1-2 (or in a variety 2-2.5) times as long as broad.

4. *R. canus*.

Achenes 1-3 or rarely 3.5 mm. long.

Petals 5-6, rarely 7-9 or 12, the blades 1-2 or rarely 2.5 times as long as broad.

5. *R. occidentalis*.

Petals 9-16 or 26, rarely fewer, the blades 2-2.5 times as long as broad.

6. *R. californicus*.

Petals minute, 3 mm. long or less, shorter than the sepals.

7. *R. Bongardii*.

Receptacle covered with bristly hairs; achene beaks straight, at least as long as the bodies; sepals reflexed.

Herbage glabrous or practically so; petals emarginate.

8. *R. Bloomeri*.

Herbage markedly hispid; petals not emarginate.

9. *R. orthorhynchos*.

Fruiting receptacle greatly enlarged and elongated.

Petals slightly longer than the sepals; stems usually rooting at the nodes; head of achenes ovoid, 7-9 mm. long.

10. *R. Macounii*.

Petals not more than half the length of the sepals; stems never rooting; head of achenes cylindrical, 11-17 mm. long.

11. *R. pennsylvanicus*.

II. ECHINELLA.

Achenes with spines on the faces or margins.

Mature achenes 5–7 mm. long, the spines straight; petals at least 4 mm. long.

Achenes with the margins produced into long spines.

Achenes without spines on the margins, the faces spiny.

Mature achenes 1–2 mm. long, the papillae on the faces produced into hooked spines; petals 1–2 mm. long.

Achenes with no spines, the faces papillate, 1–2 mm. long.

Petals 1–2 mm. long, inconspicuous; papillae of the achenes produced into hooked hairs.

Petals 8–9 mm. long and conspicuous; papillae of the achenes not produced into hairs.

12. *R. arvensis*.

13. *R. muricatus*.

14. *R. parviflorus*.

15. *R. hebecarpus*.

16. *R. sardous*.

III. EPIROTES.

Receptacle and head of achenes cylindrical or ovoid.

Nectary scale ciliate, the adjacent petal surface sometimes bearing similar hairs; achenes pubescent.

Nectary scale and the petal glabrous; achenes nearly always glabrous in Pacific States' varieties.

Achene bodies almost oblong, the beaks about 1 mm. long, straight; petals when fully expanded at least 60% longer than the sepals, 8–18 mm., rarely 5 mm. long; leaves truncate or rounded at the base.

Achene bodies obovate, the beaks 0.3–0.5 mm. long, curving or recurved; petals when fully expanded not exceeding the sepals by more than 20% to rarely 50%, 3–6 mm. long.

Radical leaves truncate to cuneate at the base; achene beaks curving, not markedly recurved.

Radical leaves cordate at the base; achene beaks recurved.

Receptacle and head of achenes spherical.

17. *R. cardiophyllus*.

18. *R. inamoenus alpeophilus*.

19. *R. Eschscholtzii*.

20. *R. verecundus*.

21. *R. glaberrimus*.

IV. FLAMMULA.

Petals 5–10, conspicuous and usually large; perennials; achene beaks 0.3 mm. long or longer.

Cauline leaves lanceolate, oblanceolate, or linear.

Roots not pubescent; petals exceeding the sepals.

Stems prostrate, rooting at the nodes.

Stems erect or reclining, never rooting.

Roots pubescent; petals not exceeding the sepals, 3 mm. long by 1–1.5 mm. broad; stems never rooting.

Cauline leaves ovate or ovate-lanceolate.

Stems rooting at least at the lower nodes; flowers never in cymes.

Roots with no thickening at the bases.

Stems not fistulous or inflated, 1–1.5 mm. in diameter; cauline petioles sheathing the stem.

Stems usually fistulous; usually 1.5–4 mm. in diameter; cauline petioles not sheathing the stem.

Roots each with a light-colored, fusiform thickening at the base; stems filiform, 1 mm. thick.

Stems never rooting; flowers usually in cymes; roots each with a light-colored fusiform thickening at the base.

Petals 1–3, minute, 1–1.5 mm. long; annuals; achene beaks 0.1–0.2 mm. long.

Sepals 5; achenes papillate on the faces; upper cauline leaves linear to lanceolate or oblanceolate or very narrowly elliptic, sessile.

Sepals 3; achenes reticulate on the faces; upper cauline leaves ovate, petioled.

22. *R. Flammula ovalis*.

23. *R. alismaefolius*.

24. *R. oresterus*.

25. *R. hydrocharoides*.

26. *R. Gormanii*.

27. *R. Populago*.

28. *R. pusillus*.

29. *R. alveolatus*.

V. HECATONIA.

Styles and achene beaks practically lacking, the stigmas sessile; achenes without corky thickening of the pericarp, marked on each face with either rough transverse ridges or a circle of "pin pricks."

Styles and achene beaks well developed, the beaks at least half as long as the bodies, 0.6–1.5 mm. long; achenes with conspicuous corky thickening of either the keel or the pericarp beside the keel, otherwise smooth.

Achenes each with corky thickening beside the inconspicuous keel (especially in the basal and ventral regions); leaves once- or twice-parted or -lobed, pentagonal, 1–2 cm. long by 1.5–2.5 cm. broad; anthers elliptic, 0.5–1 mm. long; petals 4–7 mm. long.

Achenes each with a conspicuous corky keel; leaves of aquatic specimens finely dissected into ribbon-like segments 1–2 mm. broad, the blade 1.5–10 cm. long by 2–12 cm. broad; anthers oblong, 1–1.5 mm. long; petals 7–15 mm. long.

30. *R. sceleratus*.

31. *R. Purshii*.

32. *R. flabellaris*.

VI. HALODES.

A single species.

33. *R. Cymbalaria saximontanus*.

VII. ARCTERANTHIS.

A single species.

34. *R. Cooleyae*.

VIII. PSEUDAPHANOSTEMMA.

A single species.

35. *R. hystericulus*.

IX. EUCRYMODES.

A single species.

36. *R. Andersonii*.

X. EUBATRACHIUM

Style in anthesis 2–3 times as long as the ovary; receptacle glabrous.

Style in anthesis about half as long as the ovary; receptacle hairy.

37. *R. Lobbii*.

38. *R. aquatilis capillaceus*.

1. *Ranunculus acris* L. Meadow Buttercup. Fig. 1822.

Ranunculus acris L. Sp. Pl. 554. 1753.

Perennial, stems several, erect or suberect, 5–10 dm. high, stout, hirsute. Basal leaves pentagonal, by forking of the two lateral lobes, 4–8 cm. long by 6–10 cm. broad, deeply parted

and divided, ultimate lobes sharply acute, appressed-pubescent with stiff hairs; sepals yellowish green, spreading, 4–7 mm. long, densely pubescent dorsally; petals 5, bright golden yellow, 8–14 mm. long; achenes 25–40, irregularly obovate, 2–2.5 mm. long, margin slightly keeled, beak very short, deltoid, bent or curved sharply dorsally, not recurved; receptacle little elongated in fruit.

Pastures, meadows, and roadsides, Transition Zones; occasional up to 1,000 meters in western Washington, and locally at Salem, Brooks, and Union, Oregon; also in Canada and the Northern and Middle States. Naturalized from Europe. May–July.

2. *Ranunculus repens* L. Creeping Buttercup or Crowfoot. Fig. 1823.

Ranunculus repens L. Sp. Pl. 554. 1753.

Perennial, stems rooting at the nodes, 1–5 dm. long. Basal and most cauline leaves 3-divided or -pinnate, deltoid-cordate, 1.5–4 cm. long by 2–5 cm. broad, leaflets cuneate, parted and lobed, usually pubescent; sepals green, spreading, 5–8 mm. long; petals 5, bright golden yellow, 7–13 mm. long; achenes 20–25, discoid-obovate, 2.5–3 mm. long, smooth and glabrous, the body obovate, the keel apparent on the margin, beak 1 mm. long, stout and thick, hooked at the tip; receptacle short, very slightly enlarged in fruit.

Meadows, Transition Zone; British Columbia, western Washington, and Oregon to Monterey and Fresno Counties, California; also in the Rocky Mountains and Eastern North America. Native of Eurasia. May–July. Variable in pubescence and amount of adventitious rooting.

Ranunculus repens var. *erectus* DC. Prod. 1: 38. 1824. Stems reclining to suberect, 2–4 dm. long, rather stout, 2–5 mm. in diameter, somewhat succulent, with roots at the lower nodes, but usually without stolon-like stems or branches, pubescence sparse and spreading; leaves larger than in the typical species, sometimes of 5 leaflets, not markedly pubescent; petals 5, golden yellow, 13–16 mm. long. Growing often in shallow water of meadow or marsh land; naturalized in the Puget Sound region and southward at scattered stations mostly near the coast to Curry County, Oregon; Santa Cruz, California; occasional in Quebec and Newfoundland.

Ranunculus repens var. *pleniflorus* Fernald, Rhodora 19: 138. 1917. Stems suberect, or one or two of them stoloniferous, 1.5 or commonly 4–6 dm. long, 1.3 or commonly 2–6.5 mm. in diameter, fistulous and rather succulent; the flowering stems usually not rooting, pubescence usually sparse and spreading; leaves usually larger than in the typical species, the leaflets suborbicular and rounded (instead of cuneate or sub-truncate) at the bases, crenate; petals (mostly staminodia) numerous, forming a "double" flower. Wet ground, an occasional escape from gardens in New York, New England, and Maryland; Liberty, Kittitas County, Washington.

3. *Ranunculus bulbosus* L. Bulbous Buttercup. Fig. 1824.

Ranunculus bulbosus L. Sp. Pl. 554. 1753.

Pubescent perennial, stems erect, 3–7 dm. long, stout, pubescent or glabrous. Basal leaves ovate in outline, pinnate, the leaflets deeply parted and lobed, pubescent; sepals yellowish green, reflexed, 7–10 mm. long, pubescent dorsally, the margin tinged with purple or lavender; petals 5, bright golden yellow, 8–14 mm. long; achenes 12–30, discoid, 2.5–3 mm. in diameter, margin keeled, beak short, 1 mm. long, deltoid, bent or curved sharply dorsally at the tip, slightly if at all recurved; receptacle little elongated in fruit.

Pastures, meadows, and roadsides, Transition Zone; Salem, Oregon; also in the eastern United States. Naturalized from Europe. May–July.

4. *Ranunculus canus* Benth. Sacramento Valley Buttercup. Fig. 1825.

Ranunculus canus Benth. Pl. Hartw. 294. 1848.

Ranunculus occidentalis var. *canus* A. Gray, Proc. Amer. Acad. 8: 374. 1872.

Ranunculus californicus var. *canus* Brewer & Wats. Bot. Calif. 1: 8. 1876.

Ranunculus canus var. *Blankinshipii* Robinson in Gray, Syn. Fl. N. Amer. 1¹: 35. 1895.

Perennial, stems erect, 4–9 dm. long, 3–7 mm. thick, fistulous, pubescent or glabrous. Basal leaves simple or of three pinnate leaflets, 5–7 cm. long by 6–10 cm. broad, leaflets with many lobes, appressed-pubescent; sepals yellowish, reflexed, 9–12 mm. long, pubescent dorsally; petals 5–10, bright golden yellow, claw narrow, 4–5 mm. long, scale of the nectar pit conspicuous, blade obovate, 11–14 mm. long by 5–7 mm. broad; achenes 12–20, discoid, 4–5 mm. in diameter, 0.5 mm. thick, smooth, glabrous or rarely hairy, beak stout, deltoid with a short apical hook, 1 mm. long; receptacle slightly enlarged in fruit, slender, glabrous.

Heavy soil, Upper and Lower Sonoran Zones; Inner North Coast Ranges of California from Tehama County to Yolo County, Sacramento and San Joaquin Valleys, and Sierra Nevada foothills from Butte County to Tuolumne County, California. Type locality: northwest of Oroville, California. Feb.–April.

Ranunculus canus var. *laetus* (Greene) L. Benson, Bull. Torrey Club 68: 170. 1941. (*Ranunculus californicus* var. *laetus* Greene, Fl. Fran. 299. 1892. *Ranunculus californicus* var. *canescens* Greene, Fl. Fran. 299. 1892.) Leaves compound, dissected into segments 5–8 mm. broad, usually densely pubescent with soft hairs. A variety of north slopes of California foothills where soil is especially heavy, upper edge of the Lower Sonoran Zone; Sutter County to Contra Costa County, also lower San Joaquin Valley. Type locality: Suisun, California.

Ranunculus canus var. *ludovicianus* (Greene) L. Benson, Bull. Torrey Club 68: 171. 1941. (*Ranunculus ludovicianus* Greene, Bull. Calif. Acad. 2: 58. 1886.) Stems 2.5–4 dm. long, thickly pilose-hispid; petals 10–23, half as broad as long; achenes obovate-cuneate or cuneate, 3.5 or commonly 4–5 mm. long, the beak 0.5–1 mm. long, erect, deltoid, not recurved. Usually in moist, open ground, Arid Transition or Upper Sonoran Zone; Temblor, Greenhorn, Tehachapi, San Gabriel, and San Bernardino Mountains of south-central and southern California. Type locality: mountains of San Luis Obispo County or Tehachapi, California.

5. *Ranunculus occidentalis* Nutt. Western Buttercup. Fig. 1826.

Ranunculus occidentalis Nutt. in Torr. & Gray, Fl. N. Amer. 1: 22. 1838.

Ranunculus tenuipes Heller, Muhlenbergia 1: 50. 1904.

Ranunculus occidentalis var. *laevicaulis* Suksdorf, W. Amer. Sci. 15: 58. 1906.

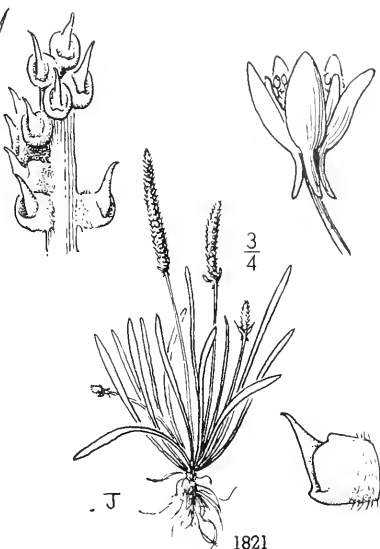
Perennial, stems erect, 2–7 dm. long, pubescent or glabrous. Basal leaves fan-shaped or semicircular, 1.5–3.5 cm. long by 2–4.5 cm. broad, 3-parted or rarely -divided, lobes cuneate,



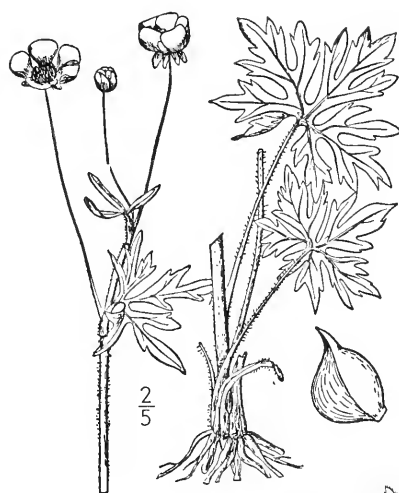
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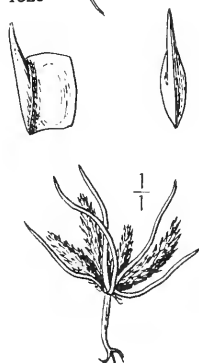
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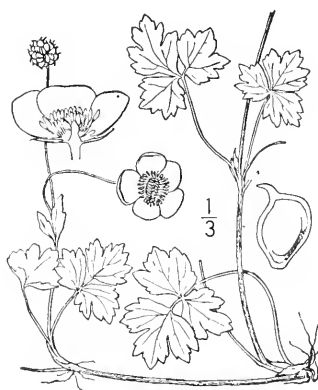
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1825



1826

1818. *Myosurus aristatus*1819. *Myosurus sessilis*1820. *Myosurus alopecuroides*1821. *Myosurus cupulatus*1822. *Ranunculus acris*1823. *Ranunculus repens*1824. *Ranunculus bulbosus*1825. *Ranunculus canus*1826. *Ranunculus occidentalis*

again lobed, appressed-pubescent; sepals greenish yellow, reflexed, 3–4 mm. long, finely pubescent; petals 5 or rarely 6–8, bright golden yellow, 8–12 mm. long; achenes 8–20 in a hemispherical cluster, discoid or obovate, strongly compressed, 2–3 mm. in diameter, beak about half the length of the body, curving or recurving above; receptacle short, but slightly enlarged in fruit.

Vernally moist prairies, Humid Transition Zone; Pacific Slope from Alaska to the Umpqua River Valley, Oregon, and in the Columbia River Gorge. Type locality: lower Columbia River in Oregon. April–June. This species, *R. canus*, *R. californicus*, and their varieties have an abundance of connecting forms.

Ranunculus occidentalis var. *Rattàii* A. Gray, Proc. Amer. Acad. 21: 373. 1886. Stems erect or suberect, 3–5 dm. long, 1–2 mm. in diameter; radical leaves simple, typically 8–25 mm. long by 15–30 mm. broad, 3-parted, the parts oblong or usually narrowly cuneate, the ultimate lobes triangular, sharply acute; petals 5–9, 5–8 mm. or sometimes 10 mm. long by 2.5–3.5 mm. broad, about twice as long as broad; achene body obovate or discoid, 2–3 mm. long by 1.8–2.8 mm. broad, appressed-hairy or usually glabrous, the beak about 1 mm. long, curving dorsally or slightly recurved, prolonging the ventral margin of the body. Openly wooded hills and prairies, Transition Zone; seaward Coast Ranges from Coos County and western Josephine County, Oregon, to Mendocino County and western Lake County, California. Type locality: Klamath River, California. The hispid achene is to be found in any of the southern forms of *R. occidentalis* as well as in *R. californicus* and *R. canus*.

Ranunculus occidentalis var. *Eisenii* (Kell.) A. Gray, Proc. Amer. Acad. 21: 373. 1886. Stems erect or suberect, 3–7 dm. long, 2–5 mm. in diameter; radical leaves like the typical species or frequently larger or pinnately compound; petals 5 or 6 or sometimes 8, 7–12 mm. long by 4–8 mm. broad, 1.1–2 times as long as broad; achene body discoid or obovate-discoid, 2–3.5 mm. long by 1.9–3.3 mm. broad, rarely longer, glabrous or sometimes hispid, the beak 0.5–1 mm. long, falcate, usually recurved a little, prolonging the ventral margin of the achene body. Vernality moist ground in the California foothills and mountain valleys at 100–1,300 meters (or up to 2,200 meters in Kern County), beneath oaks (leaves simple) or in vernal meadows or rivulets (leaves compound); from Trinity County south in the Inner Coast Ranges to Napa County and in the Sierra Nevada foothills to the Tehachapi Mountains. Type locality: near Fresno, California. The form occurring from southeastern Jackson County and southwestern Klamath County, Oregon, to Shasta County, California, is intermediate between the varieties *Eisenii* and *ultramontanus*.

Ranunculus occidentalis var. *ultramontanus* Greene, Pittonia 3: 13. 1896. (*Ranunculus alceus* Greene, Erythra 3: 69. 1895.) Stems flexuous, reclining or sometimes erect, 3–6 dm. long, 1–2 mm. in diameter; radical leaves thin, 2–5 cm. long by 2–6 cm. broad or sometimes larger, commonly simple and 3-parted, but frequently compound with 3–5 leaflets, the larger divisions typically lanceolate, but sometimes cuneate and again lobed, the ultimate lobes usually not triangular; petals 5 or sometimes 6, 2–8 mm. long by 1.5–3 mm. broad, twice as long as broad; achene body elliptic, 2.5–3 mm. long by 1.5–2 mm. broad, glabrous, the beak 0.7–1.3 mm. long, falcate, sometimes recurved, produced from the apex of the achene. Mountain streams and meadows, Transition and lower Canadian Zones; mountains of Siskiyou and Modoc Counties south in the North Coast Ranges, and in the Sierra Nevada, largely on the eastern side, to Inyo County, California. Type locality: Truckee River, California.

Ranunculus occidentalis var. *disséctus* Henderson, Rhodora 32: 25. 1930. (*Ranunculus ciliosus* Howell, Fl. N.W. Amer. 1: 17. 1897. *Ranunculus marmorarius* Jepson & Tracy in Jepson, Fl. Calif. 542. 1922.) Stems erect or reclining, 2–3 dm. long, 1.5–2.5 mm. in diameter; radical leaves thin, usually deeply 3-parted, parts commonly simple and lanceolate or lanceolately-parted, ultimate lobes not triangular, pubescence not particularly dense but somewhat silky; petals 5, 5–10 mm. long by 4–6 mm. broad, glabrous, the beak 1.5–1.9 mm. long, slender, straight, hooked at the extreme tip, prolonging the ventral margin of the achene body, rarely like the typical species. Meadows, Transition Zone; Rogue River—Umpqua River Divide, and mountains and plateaus of eastern Oregon, also Marble Mountain, Siskiyou County, California. Type locality: Crater Lake National Park, Oregon.

Ranunculus occidentalis var. *Howellii* Greene, Pittonia 3: 14. 1896. Stems commonly erect or suberect, 2–4 dm. long, 1–3 mm. in diameter; radical leaves simple and like the typical species, but often with the primary parting deeper or with more dense silky pubescence; petals 5–6, 7–12 mm. or 18 mm. long by 3–6 mm. or 8 mm. broad, usually 2–2.2 times as long as broad; achene body broadly ovate, 3 mm. long by 2.5 mm. dorsoventrally, appressed-hairy or glabrous, the beak 2 mm. long, straight but hooked at the extreme tip, prolonging the ventral margin of the achene body. Openly wooded hills; borderland between the Transition and Upper Sonoran Zones; Rogue River watershed in Jackson and Josephine Counties, Oregon. Type locality: Ashland, Oregon.

6. *Ranunculus californicus* Benth. California Buttercup. Fig. 1827.

Ranunculus dissectus Hook. & Arn. Bot. Beechey 316. 1840. Not Bieb. 1819.

Ranunculus Deppet Nutt. in Torr. & Gray, Fl. N. Amer. 1: 21, cited as synonym. 1838.

Ranunculus delphinifolius Torr. & Gray, Fl. N. Amer. Suppl. 659. 1840. Not Torr. 1818.

Ranunculus californicus Benth. Pl. Hartw. 295. 1848.

Ranunculus californicus var. *latilobus* A. Gray, Proc. Amer. Acad. 21: 375. 1886.

Perennial, stems erect, 3–6 dm. long, spreading-pubescent or glabrous. Basal leaves mostly long-ovate, but often broader than long, 2.5–7 cm. long by 1.5–4 cm. broad, rarely simple and 3-parted, nearly always pinnate, leaflets 3–5, cuneate, lobed or parted, appressed-pubescent; sepals greenish yellow, reflexed, pointed, 4–8 mm. long, sparsely pubescent; petals 9–16, bright golden yellow, rather short-clawed, 8–15 mm. long by 3–5 mm. broad; achenes 5–35, subdiscoid or obovate, 2–2.5 mm. long, very strongly compressed, smooth and glabrous or rarely hairy; the beak one-third as long as the body, recurved or hooked above; receptacle not elongated in fruit.

Vernally moist lands, Upper Sonoran or rarely Transition Zones; Humboldt County, California, south in the Outer Coast Ranges to Lower California, east from San Francisco Bay to the Sierra Nevada foothills. Type locality: Monterey, California. Jan.–May.

Ranunculus californicus var. *grátus* Jepson, Fl. W. Mid. Calif. 201. 1901. Subglabrous or thinly pilose, except on the leaves; terrestrial; stems erect or reclining, 3–7 dm. long, 1.5–3 mm. in diameter, a little fistulose, not tough; radical leaves simple, broadly cordate or very broadly ovate in outline, 1.8–4 cm. long by 2.3–5 cm. broad, 3-parted or lobed, the lobes again shallowly lobed, cuneate, thin, ultimate lobes obtuse or acute, rather thinly pubescent, petioles 7–15 cm. or 25 cm. long; cauline leaves often 3-parted and with a strikingly elongated oblong middle part; petals 5–9 or 12, 3–10 mm. long by 2–5 mm. broad; achenes 10–20, each nearly discoid, 2.5 mm. long by 2 mm. broad, the beak slender, 1–1.5 mm. long, recurved. Deep canyons and north slopes, Humid Transition Zone; inner edge of the redwood belt from Curry County, Oregon, to western Lake and Napa Counties and the Monterey Peninsula, California. Type locality: hills near Napa Valley, California.

Ranunculus californicus var. *cuneátus* Greene, Fl. Fran. 299. 1892. (*Ranunculus californicus* var. *crassifolius* Greene, Erythra 1: 125. 1893.) Moderately or sparsely pilose or short-pubescent; terrestrial; reported to be often annual; stems prostrate, only the pedicels assurgent, rooting at the basal underground nodes, 1–2.5 dm. long, not ordinarily fistulose, tough; radical leaves simple, round-cordate or cordate, 1.5–4 cm. long by 2–6 cm. broad, 3-lobed to deeply 3-parted, the lobes again lobed or toothed, cuneate, ultimate lobes rounded or obtuse, moderately pubescent, petioles 3–12 cm. long; sepals striking for being usually purple

or partly so dorsally; petals like the typical species (but only 5 in Oregon forms); achenes 20–30, like the typical species. Sea bluffs, Transition and Upper Sonoran Zones; Columbia River south along the coast to Monterey County and the Santa Barbara Islands, California. Oregon specimens tend to have fewer petals and compound leaves. Type locality: San Mateo County, California.

Ranunculus californicus var. *rugulòsus* (Greene) L. Benson, Amer. Journ. Bot. 23: 30. 1936. Nearly glabrous or the leaves appressed-pilose; palustrine or practically so; stems erect or suberect, 3–6 dm. long, 2–3 mm. in diameter, distinctly fistulous, rather delicate; radical leaves simple or pinnate with 3–5 leaflets, ovate in outline or the base cuneate, 2–7 cm. long by 2–6 or 9 cm. broad, deeply 3-parted or 3–5-divided, and again once- or twice-lobed, or -cleft, the segments tending to be oblanceolate or sometimes narrowly cuneate, ultimate lobes acute, sparsely pubescent; petioles 1 or commonly 2–3 dm. long; petals 7–12, 7–11 mm. long by 3 mm. broad; achenes 15–30, each obovate, 1–2 mm. long by 1–1.5 mm. broad, the beak usually slender and 0.7–0.8 mm. long, recurved. Wet sand of rivers and ditches, Lower Sonoran Zone; Sacramento and San Joaquin valleys and lower Sierra Nevada foothills from Merced and Tuolumne Counties to Tulare County, California. Type locality: Chowchilla "Mountains," west of Wawona, California.

7. *Ranunculus Bongárdii* Greene. Bongard's Buttercup. Fig. 1828.

Ranunculus occidentalis var. *Lyallii* A. Gray, Proc. Amer. Acad. 21: 373. 1886.

Ranunculus Bongardii Greene, Erythea 3: 54. 1895.

Ranunculus Greenei Howell, Fl. N.W. Amer. 1: 18. 1897.

Perennial, stems erect, 3–6 dm. long, hirsute. Basal leaves larger than the cauline, cordate-reniform, 2.5–6 cm. long by 3.5–7.5 cm. broad, 3-parted, primary lobes shallowly again lobed, all lobes acute, appressed-hispidulose; pedicels not over 1.5 cm. long in anthesis; sepals reflexed, 2 mm. long, hispidulose, deciduous; petals 5, yellow, 1.5–1.8 mm. long by 1 mm. broad; achenes 8–20, obovate, strongly compressed, 2 mm. long, faces appressed-hispid, beak strongly hooked at the summit, a little longer than the body; receptacle not enlarged in fruit, glabrous.

Shaded moist slopes, Transition Zone; common in the Humid Transition, from Alaska to Humboldt County, California; less common and at scattering stations in the Arid Transition, to the Sierra Nevada and San Bernardino Mountains, California, and to the Great Basin and northern Rocky Mountains. Type locality: Sitka, Alaska. May–July.

Ranunculus Bongardii var. *tenellus* (Nutt.) Greene, Erythea 3: 54. 1895. (*Ranunculus Douglasii* Howell, Fl. N.W. Amer. 1: 18. 1897.) Winter annual, glabrous or the sparse hair softer than in the typical species; basal leaves often dying early, usually smaller than the cauline, the lobes rounded; achenes 15–30, glabrous, the beaks considerably shorter than the bodies. Transition Zone or Lower Canadian Zone; Alaska south on the Pacific Slope to the San Bernardino Mountains, southern California, northern Great Basin, and the Rocky Mountains. Type locality: Columbia and Willamette Rivers, Oregon.

8. *Ranunculus Bloëmeri* S. Wats. Bloomer's Buttercup. Fig. 1829.

Ranunculus Bloomeri S. Wats. Bot. Calif. 2: 426. 1880.

Glabrous or sparingly hispid perennial, stems 2–5 dm. long, succulent, fistulous, stout. Basal leaves 3- or 5-pinnate, cordate-ovate in outline, 5–9 cm. long by 5–8.5 cm. broad, leaflets orbicular or ovate, serrately shallow-lobed, thick and shiny; sepals reflexed, ovate-attenuate, 7–10 cm. long, promptly deciduous, glabrous; petals 5–8, bright yellow, emarginate, 10–17 mm. long; achenes 35–60 in an ovoid head 10 mm. long by 8 mm. broad, 3 mm. long, almost 1 mm. thick, smooth and glabrous, beak 2.5–3 mm. long, turning distinctly ventrally; receptacle little elongated in fruit, bristly.

Very wet and heavy adobe soil. Transition and Upper Sonoran Zones; Mendocino and Lake Counties to Santa Clara County, California. Type locality: San Francisco, California. April–May.

9. *Ranunculus orthorhynchus* Hook. Straight-beaked Buttercup. Fig. 1830.

Ranunculus orthorhynchus Hook. Fl. Bor. Amer. 1: 21. pl. 9. 1829.

Perennial, stems 1.5–5 dm. long, fistulous, hispidulose, hairs ascending especially above. Basal leaves pinnate, ovate, 4–13 cm. long by 3–10 cm. broad; leaflets 3–7, again twice-forked or -lobed, the divisions all (typically) linear or else cuneate, appressed-pubescent or glabrous; sepals reflexed, 7–8 mm. long, pubescent; petals 5, ventrally bright yellow, dorsally dull or frequently reddish or red, 8–19 mm. long by 4–7 mm. broad; achenes 12–20 in a cluster, bodies 3–4 mm. long, faces flat or sunken, margin keeled, beak straight, 3–4 mm. long; receptacle little enlarged in fruit.

Meadows, Transition Zone; Pacific Slope, Alaska to the North Coast Ranges and central Sierra Nevada, California, east to Goose Lake, California. Type locality: northwest America. May–June.

Ranunculus orthorhynchus var. *platyphyllus* A. Gray, Proc. Amer. Acad. 21: 377. 1886. (*Ranunculus maximus* Greene, Bull. Torrey Club 14: 118. 1887. *Ranunculus politus* Greene, Pittonia 5: 196. 1903.) Stems 6–12 dm. long, often 7–9 mm. thick, spreading hirsute, sometimes rather densely so; basal leaves pinnate with 5–7 leaflets; petals broader and shorter than in the typical species; achenes 20–35, beak slightly shorter and less rigid than in the typical species; receptacle slightly elongated in fruit. Transition Zone; British Columbia to central California east to Idaho and Utah. Type locality: Long Valley, Mendocino County, California.

Ranunculus orthorhynchus var. *Hallii* Jepson, Fl. Calif. 542. 1922. Hair of stems and petioles spreading; leaves the size of those in the typical species, the divisions often as broad as long, shallowly and obtusely lobed; achenes 4–17, usually few, marginal keel more distinctly carried into the beak than in the typical species. Mountain meadows, Transition Zone; Sierra Nevada, 2,000 meters, from Yosemite National Park to Fresno County, California. Type locality: Pine Ridge, Fresno County.

10. *Ranunculus Macounii* Britt. Macoun's Buttercup. Fig. 1831.

Ranunculus hispidus Hook. Fl. Bor. Amer. 1: 19. 1829. Not Michx. 1803.

Ranunculus Macounii Britt. Trans. N.Y. Acad. 12: 3. 1892.

Ranunculus oreganus Howell, Fl. N.W. Amer. 1: 19. 1892.

Ranunculus radis Greene, Ottawa Nat. 16: 33. 1902.

Perennial, stems frequently rooting at the nodes, 2–5 or 9 dm. long, densely hispid or glabrous, hairs 2–2.5 mm. long. Basal leaves 3-divided or 3- to 5-pinnate, cordate or cordate-

deltoid in outline, 3–8 cm. long by 5–13 cm. broad, leaflets 3-parted, parts again lobed; sepals spreading, 3–4.5 mm. long, pubescent or glabrous; petals 5, yellow, obovate, 5–7 mm. long; achenes 30–50 in an ovoid cylindrical head 7–12 mm. long by 5–7 mm. in diameter, each achene 3 mm. long, smooth and glabrous, the beak short and straight; receptacle enlarged in fruit, hairy.

Muddy ground, Transition Zone; Alaska south to Oregon and Goose Lake, California, east to Hudson Bay and Iowa, Arizona, and New Mexico; also in Siberia. Type locality: Mackenzie River, Northwest Territory, Canada. June–July.

11. *Ranunculus pennsylvanicus* L. f. Bristly Buttercup or Crowfoot. Fig. 1832.

Ranunculus pennsylvanicus L. f. Suppl. 272. 1781.

Perennial, stems simple below, branching above, 4–10 dm. long, fistulous, hispid. Basal leaves early deciduous; cauline leaves pinnate, the lower 5–7 cm. long by 9–13 cm. broad, leaflets petiolate, cuneate, the middle one 3-parted and again lobed, appressed-hispidulose; sepals reflexed, 4–5 mm. long, slightly hairy; petals 5, yellow, nearly round, 2–3 mm. long; achenes 60–80 in a cylindrical or ovoid-cylindrical head 10–14 mm. long by 7–9 mm. in diameter, body 2.5 mm. long by 1.8 mm. broad, smooth and glabrous, beak 1 mm. long, deltoid; receptacle elongated in fruit, pubescent.

Transition Zone; British Columbia south to northern Washington, east to Nova Scotia and Pennsylvania; also in eastern Asia. Type locality: Pennsylvania. May–July.



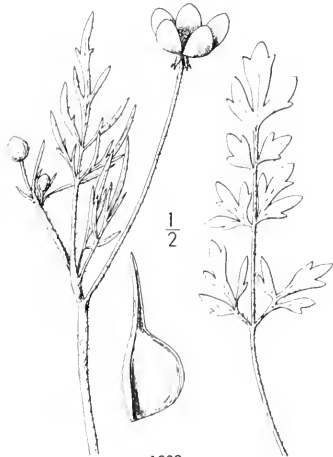
1827



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1832

1827. *Ranunculus californicus*
1828. *Ranunculus Bongardii*

1829. *Ranunculus Bloomeri*
1830. *Ranunculus orthorhynchus*

1831. *Ranunculus Macounii*
1832. *Ranunculus pennsylvanicus*

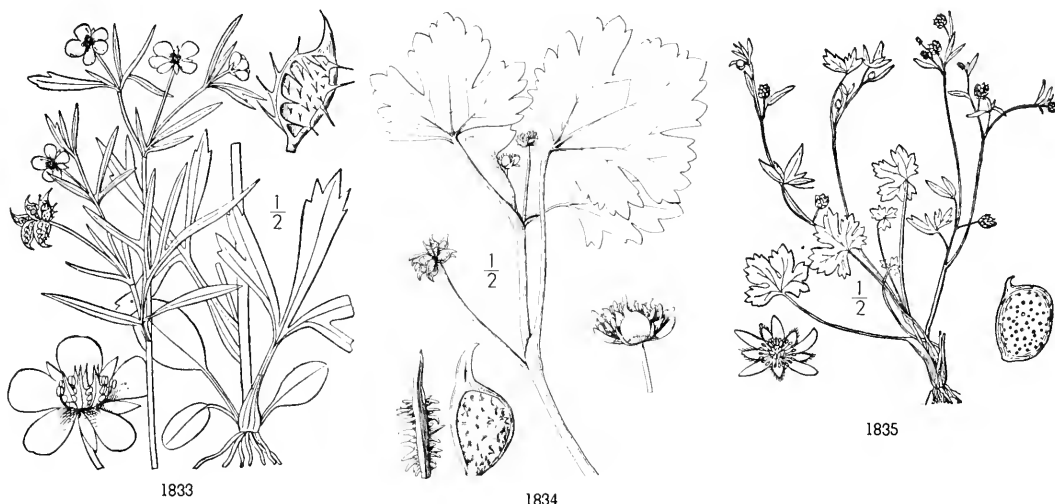
12. *Ranunculus arvensis* L. Field Buttercup or Hunger Weed. Fig. 1833.*Ranunculus arvensis* L. Sp. Pl. 555. 1753.

Annual, stems mostly solitary, erect, 1.5–5 dm. long, slightly hairy above. Basal leaves cuneate-ovate, 1.5–3.5 cm. long by 1.5–4.5 cm. broad, deeply 3-parted, lobes obovate-lanceolate, sometimes again shallowly lobed, glabrous or thinly pubescent; sepals spreading, lanceolate, 6–7 mm. long, pubescent; petals 5, yellow, 6–8 mm. long; stamens 10–15; achenes 5 in a whorl, short-stalked, obovate, 5 mm. long, compressed, faces with short spines, the thickened border produced into long spines, beak curving dorsally, stout; receptacle not enlarged in fruit, slightly hairy at the summit.

Fields, Transition and Upper Sonoran Zones; naturalized in Yamhill and Marion Counties and in the southern part of Oregon, also in Mendocino and Mariposa Counties, California; eastern United States. Native of Europe. July–Sept.

13. *Ranunculus muricatus* L. Prickle-fruited Buttercup. Fig. 1834.*Ranunculus muricatus* L. Sp. Pl. 555. 1753.

Glabrous perennial, stems several, reclining, usually stout, 2–4 dm. long. Basal leaves broadly cordate or else suborbicular and truncate at the base, 2–4 cm. long by 2–4.5 cm. broad, deeply



1833. *Ranunculus arvensis*
1834. *Ranunculus muricatus*

1835. *Ranunculus parviflorus*
1836. *Ranunculus hebecarpus*

1837. *Ranunculus sardous*
1838. *Ranunculus cardiophyllus*

3-lobed, the lobes again shallowly crenately-lobed; pedicels 1–4 cm. long; sepals thin, 4–5 mm. long; petals 5, yellow, 5–8 mm. long, clawed; achenes 10–20, bodies sessile, obovate, 5 mm. long, faces spiny-muricate, margin thick and bevelled and keeled, without spines, the keel produced along the 2–2.5 mm. long very stout and somewhat curving beak; receptacle short, not enlarged in fruit.

Meadows and lake borders, Transition and Upper Sonoran Zones; naturalized in western Washington and Oregon, south to central California; also in the southern United States. Native of Europe. April–June.

14. *Ranunculus parviflorus* L. Small-flowered Buttercup. Fig. 1835.

Ranunculus parviflorus L. Sp. Pl. ed. 2. 780. 1762.

Annual or perhaps biennial, stems several, suberect, 1–3 dm. long, much-branched, thinly long-pilose. Basal leaves reniform, 3-parted or -divided, 1.5–2 cm. long by 2–2.5 cm. broad, segments lobed or forked, ultimate lobes acute, finely pubescent; pedicels obscure in anthesis; sepals 6, 1 mm. long, very hairy; petals 1 or 2, yellow, 1 mm. long; achenes 10–20, obovate, 1.5 mm. long, fairly turgid, faces covered with reddish-brown papillae which are produced into minute slender hooks, margin strongly marked, beak deltoid, 0.5 mm. long, recurved; receptacle not markedly enlarged in fruit.

Fields, Transition Zone; naturalized in Humboldt County, California, and in the eastern and southern United States. Native of Europe. June–August.

15. *Ranunculus hebecarpus* Hook. & Arn. Pubescent-fruited Buttercup. Fig. 1836.

Ranunculus hebecarpus Hook. & Arn. Bot. Beechey 316. 1840.

Ranunculus hebecarpus var. *pusillus* Brewer & Wats. Bot. Calif. 1: 9. 1876.

Tiny annual, stems suberect, 1–3 dm. long, filiform, long-pubescent. Basal leaves cordate-reniform, 6–15 mm. long by 12–22 mm. broad, rather deeply 3-parted, again lobed, ultimate lobes acute, appressed-pubescent; sepals green, broadly scarious-margined, spreading, 1 mm. long, densely pilose; petals 1, 2 or none, yellow, 1 mm. long; stamens 10 or more; achenes 4–10, round-ovate, 2 mm. in diameter, compressed, densely beset with papillae produced into stiff, hooked hairs, beak stout and thick, hooked at the tip; receptacle pyriform, very small, glabrous.

Shade of trees, Transition or chiefly Upper Sonoran Zone; southern Washington south through western Oregon to southern California, east to Idaho. Type locality: California. April–May.

16. *Ranunculus sardous* Crantz. Hairy Buttercup. Fig. 1837.

Ranunculus sardous Crantz, Stirp. Austr. ed. 1. fasc. 2: 84. 1763.

Ranunculus parvulus L., Mant. 79. 1767.

Probably perennial, stems several, suberect, 1–3 dm. long, much-branched, pubescent or nearly glabrous. Basal leaves pinnate, 2–3 cm. long by 2–2.5 cm. broad, the 3 leaflets parted and lobed, ultimate segments deltoid, pubescent; pedicels 3–5 cm. long in anthesis; sepals 5, reflexed, 5 mm. long, pilose; petals 5, yellow, cuneate, 8–9 mm. long by 5–7 mm. broad; achenes 12–25, faces reddish brown, papillate, margin strongly marked, beak 0.3 mm. long, deltoid, curved at the tip; receptacle but slightly elongated in fruit, covered with long white hairs.

Transition Zone in this area; naturalized on the Columbia River at Portland, Oregon, and Fortuna, Humboldt County, California. Type locality: European. June–August.

17. *Ranunculus cardiophyllus* Hook. Heart-leaved Buttercup. Fig. 1838.

Ranunculus cardiophyllus Hook. Fl. Bor. Amer. 1: 14. pl. 5. f. B. 1829.

Ranunculus affinis var. *cardiophyllus* A. Gray, Proc. Acad. Phila. 15: 56. 1863.

Ranunculus pedatifidus var. *cardiophyllus* Britt. Bull. Torrey Club 18: 265. 1891.

Pilose perennial, stems branching, 3–6 dm. long. Basal leaves oblong-ovate or cordate, 3–4.5 cm. long by 2–4 cm. broad, crenate, the terminal lobe scarcely longer than the others in any leaf; sepals densely tomentose dorsally and slightly red- or lavender-tinged, spreading, deeply concave; petals 9–12 mm. long, nearly twice as long as the sepals, the nectary scale ciliate; achenes about 50 in a cylindrical head 10–13 mm. long by 7–8 mm. in diameter, the bodies 1.5–2 mm. long, canescent; beak short, fleshy; receptacle elongated in fruit.

Transition Zone; Rocky Mountains; specimens from Fort Colville, northeastern Washington, are attributed by Piper to this species. Type locality: Canada. June–July.

18. *Ranunculus inamoënis* var. *alpeophilus* (A. Nels.) L. Benson.

Nelson's Buttercup. Fig. 1839.

Ranunculus alpeophilus A. Nels. Bull. Torrey Club 26: 350. 1899.

Ranunculus inamoënis var. *alpeophilus* L. Benson, Bull. Torrey Club 68: 651. 1941.

Nearly glabrous perennial, the stems 2.5–4 dm. long. Basal leaves cuneate-obovate, ovate, or nearly cordate-reniform, 2–3 cm. long by 3–5 cm. broad, 3-parted, the lateral lobes crenate, the terminal lobe lingulate and entire; sepals spreading, equaling or nearly equaling the petals, hairy; petals 5, yellow, 5–6 mm. long; achenes about 50 in a cylindrical head 9–12 mm. long by 6–7 mm. in diameter, the bodies 1.5 mm. long, finely pubescent; beak short, slender; receptacle elongated in fruit.

Mountain meadows, Transition Zone; Rocky Mountain region. A single specimen from Newport, Pend Oreille County, Washington, belongs to this variety. Type locality: Wyoming. June–July.

19. *Ranunculus Eschscholtzii* Schlecht. Eschscholtz's Buttercup. Fig. 1840.

Ranunculus Eschscholtzii Schlecht. Animad. Ranunc. 2: 16. pl. 1. 1820.

Ranunculus Eschscholtzii var. *Helleri* L. Benson, Amer. Journ. Bot. 23: 169. 1936.

Glabrous perennial, caudex about 1 cm. long, rather thick, stems 15–35 cm. long, nearly simple. Basal leaves semicircular to reniform, 2–3 cm. long by 2.5–4 cm. broad, deeply 3-parted, the middle lobe again 3-lobed or entire, the lateral unequally 3- to 5-lobed, all divisions rounded; sepals dorsally lavender-tinged, spreading, about half to three-fifths the length of the petals; petals 5, yellow, 6–10 mm. long; achenes 30–75 in a cylindrical or ovoid head 9–16 mm. long and 5–7 mm. in diameter, 1 mm. long, beak filiform, half to four-fifths the length of the body; receptacle elongated in fruit, glabrous.

Meadows and talus slopes near timber-line, Arctic-Alpine and Hudsonian Zones; Alaska south through the Olympic, Cascade, and Wallowa Mountains of Washington and Oregon; also in the Rocky Mountains and rare in the Sierra Nevada. Type locality: Unalaska, Aleutian Islands, Alaska. July–Aug.

Ranunculus Eschscholtzii var. *Suksdórfii* (A. Gray) L. Benson, Amer. Journ. Bot. 23: 170. 1936. Caudex 1–1.5 or rarely 2.5 cm. long by 3–5 or 7 mm. in diameter; basal leaves thin, deeply 3-parted, the middle lobe again 3-lobed, the ultimate lobes and sinuses sharply acute, scarious stipular leaf bases 1–2 cm. long, annually deciduous; petals 7–11 mm. long by 5–10 mm. broad; achenes glabrous. Mountain meadows and slopes, Arctic-Alpine and Hudsonian Zones; Olympic and Cascade Mountains, Washington, east to northern Idaho and Montana; 1,700–2,000 meters elevation. Type locality: Mount Adams, Washington.

Ranunculus Eschscholtzii var. *trisectus* (Eastw.) L. Benson, Amer. Journ. Bot. 23: 170. 1936. Caudex 1 or 3–6 cm. long by 4–7 mm. in diameter, usually branched; basal leaves usually thin, deeply 3-parted, the middle lobe again 3- to 7-lobed, scarious stipular leaf bases 1.5–2.5 cm. long, usually persistent for a season or more after death of the leaf; achenes hispid or glabrous. Mountain meadows and slopes, Arctic-Alpine Zone; Wallowa and Steen Mountains, eastern Oregon, east to mountains of central Idaho; 2,000–3,000 meters elevation. Type locality: Wallowa Mountains.

Ranunculus Eschscholtzii var. *oxynotus* (A. Gray) Jepson, Fl. Calif. 1: 537. 1922. Caudex 3–7 mm. long by 5–12 mm. in diameter, often branched; basal leaves thick, 3-cleft or rarely parted, the middle lobe entire and lingulate or rarely (Tulare County) 3-lobed, the lateral lobes crenate, stipular leaf bases thickened and persistent for one or more seasons; achenes glabrous. Meadows and talus, Arctic-Alpine or Hudsonian Zone; Warner Mountains, California, south in the Sierra Nevada and neighboring desert ranges of California and adjacent Nevada and in the San Bernardino and San Jacinto Mountains, California. Type locality: Castle Peak (Mount Stanford), Sierra County, California.

20. *Ranunculus verecundus* Robinson. Timber-line Buttercup. Fig. 1841.

Ranunculus verecundus Robinson, Contr. U.S. Nat. Herb. 11: 274. 1906.

Ranunculus ramulosus M. E. Jones, Contr. West. Bot. No. 14: 47. 1912.

Glabrous perennial, caudex short, stem 8–20 cm. long, mostly unbranched, slender. Basal leaves cordate or reniform, 7–12 mm. long by 9–18 mm. broad, palmately 3-parted, the middle lobe again 3-lobed, the lateral unequally 3- to 5-lobed, lobes obtuse or rounded, sinuses rounded out; cauline leaves 1–3; pedicels 1–10 cm. long; sepals dorsally lavender-tinged, spreading, nearly equaling the corolla, pubescent; petals 5, yellow, rather narrow, 3–5 mm. long; achenes in a cylindrical head 5–8 mm. long, obovate, 1.5 mm. long, smooth and glabrous, the beak one-half as long as the body, distinctly recurved at the tip; receptacle elongated in fruit, glabrous.

Wet gravelly slopes above the timber-line, Arctic-Alpine Zone; central Alaska, Mount Stuart, Mount Rainier, and Mount Adams, Washington, and Custer County, Idaho. Type locality: Mount Adams, Washington. July–Aug.

21. *Ranunculus glaberrimus* Hook. Sagebrush Buttercup. Fig. 1842.

Ranunculus glaberrimus Hook. Fl. Bor. Amer. 1: 12. pl. 5. f. A. 1829.

Ranunculus Austiniae Greene, Erythraea 3: 44. 1895.

Glabrous perennial, roots numerous, large, stems reclining, 4–18 cm. long. Basal leaves round to ovate, 2–3 cm. long, 3- (or 5-) lobed at the apex, thick; cauline leaves 3-parted or -divided; peduncles 5–12 cm. long; sepals dorsally lavender-tinged, elliptic or round; petals 5, rarely more, bright yellow, broadly obovate, 6–15 mm. long; achenes 75–150 in a globose head 1–2 cm. in diameter, nearly spherical, 1.5 mm. long, turgid, usually finely pubescent, beaks slender or flattened and a little winged, one-third or one-half as long as the bodies; receptacle enlarged in fruit, glabrous.

Sandy soil, sagebrush region, Arid Transition and Upper Sonoran Zones; British Columbia to Plumas County, California, east to Colorado. Type locality: Kettle Falls, Columbia River, Washington. April–May.

Ranunculus glaberrimus var. *ellipticus* Greene, Fl. Fran. 1: 298. 1892. Basal leaves entire, elliptical or oblanceolate, 3–5 cm. long, tapering into the petiole; upper cauline leaves with the middle division elongated. Mountain meadows, Canadian Zone; mountains in the range of the typical species, Okanogan County, Washington, south to Nevada County, California, east to Colorado. Type locality: Colorado.

Ranunculus glaberrimus var. *reconditus* (A. Nels. & Macbr.) L. Benson, Amer. Journ. Bot. 23: 170. 1936. (*Ranunculus triternatus* A. Gray, Proc. Amer. Acad. 21: 370. 1886. Not Poir. 1823.) Basal leaves finely dissected, being triternately parted or divided, the primary divisions long-petiolate and the lobes from filiform-linear to linear-spatulate, obtuse, the dissected blade deltoid to reniform, 2 cm. long by 2.5 cm. broad; cauline leaves similar. Vernal moist slopes of high hills, Arid Transition Zone; Klickitat County, Washington, and The Dalles of the Columbia River in Washington and Oregon. Type locality: Goldendale, Washington.

22. *Ranunculus Flammula* var. *ovalis* (Bigelow) L. Benson. Creeping Buttercup or Crowfoot. Fig. 1843.

Ranunculus filiformis var. *ovalis* Bigelow, Fl. Bost. ed. 2. 239. 1824.

Ranunculus reptans var. *ovalis* Torr. & Gray, Fl. N. Amer. 1: 16. 1838.

Ranunculus reptans var. *strigosus* Freyn, Deutsch. Bot. Monatss. 8: 181. 1890.

Ranunculus Flammula var. *ovalis* L. Benson, Bull. Torrey Club 69: 305. 1942.

Glabrous or slightly appressed-pubescent perennial, the stems creeping or reclining, rooting at the nodes, often stolon-like, 1–4 dm. long. Leaves usually all alike, linear-spatulate to oblanceo-

late or lanceolate, 1.5–5 cm. long by 2.5–4 mm. broad, entire, petioles 1–6 cm. long or reduced, not sheathing the stem; pedicels from any node, 1–4 cm. long; sepals greenish yellow, spreading or somewhat reflexed, ovate, 3–5 mm. long, glabrous or pubescent; petals 5 or 10, bright yellow, rectangular-obovate, 6–9 mm. long; stamens 20–30; achenes 10–25, the body obovoid, turgid, smooth and glabrous, the beak short and thick, closely recurved; receptacle not enlarged in fruit.

Muddy or marshy ground or wet sand from sea level up to 1,000 meters or up to 2,500 meters southward, Transition Zone; Alaska to north coastal and montane California, northern Arizona, and Colorado, and eastward to Newfoundland and New England. Type locality: Boston, Massachusetts. May–July. Variable in size of leaves and amount of adventitious rooting. A few specimens from Washington and Oregon closely approach typical *R. Flammula* which is marked by an almost obsolete achene beak.

Ranunculus Flammula var. *samolifolius* (Greene) L. Benson, Bull. Torrey Club 69: 306. 1942. (*Ranunculus samolifolius* Greene, Pittonia 3: 13. 1900.) Cauline leaves usually sessile and the petioles inclined to sheath the stem, the blades ovate to obovate or very broadly oblanceolate, 1.5–3 cm. long, 1–1.2 cm. broad. Cascade Mountains of Oregon in Klamath County, to Plumas County, California. Type locality: Mount Shasta, California.

23. *Ranunculus alismaefolius* Geyer. Water Plantain Buttercup. Fig. 1844.

Ranunculus alismaefolius Geyer ex Benth. Pl. Hartw. 295. 1848.

Ranunculus Bolanderi Greene, Bull. Calif. Acad. 2: 58. 1886.

Glabrous and robust perennial, stems erect, 3–8 dm. long, thick. Basal leaves lanceolate, 4–12 cm. long by 1–3 cm. broad, blunt at the apex, tapering into the petiole, often serrulate, thick; cauline leaves alternate below, the bracts opposite; sepals spreading, one-third the length of the petals, pubescent dorsally; petals 5, bright yellow, obovate, 1 cm. long; achenes 30–50 in a subglobose head, each 2 mm. long, the beak short and curving dorsally from the base; receptacle enlarged by 4–5 mm. in fruit, pyriform.

Muddy lake borders and ditches, Transition Zone; British Columbia south to Mendocino County, California, east to Idaho. Type locality: Coeur d'Alene, Idaho. April–June.

Ranunculus alismaefolius var. *Hartwegii* (Greene) Jepson, Fl. Calif. 534. 1922. Glabrous; stems 2–4 dm. long, 1.5–2.5 mm. in diameter, branching above, several-flowered; radical leaf blades lanceolate, 4–10 cm. broad, entire, of intermediate thickness between *R. alismaefolius* and var. *alismellus*; petals 5, 6–8 mm. long, the nectary scale attached nearly to its apex, often lobed; achenes 20–30, each 2 mm. long by 1.5 mm. dorsoventrally by 0.8 mm. laterally, the beak about 0.7 mm. long; receptacle 1–1.5 mm. long in fruit. Mountain meadows, Transition Zone; Blue Mountains, Oregon, south in the Sierra Nevada to Calaveras County, California; also in the northern Rocky Mountains. Type locality: Bear Valley, Nevada County, California.

Ranunculus alismaefolius var. *alismellus* A. Gray, Proc. Amer. Acad. 7: 327. 1868. Glabrous; stems 1–2 or 3 dm. long, 1–1.5 mm. in diameter, often simple, usually 1- or 2-flowered; radical leaf blades obovate-lanceolate or sometimes ovate, 2–4 cm. long, entire, thin; petals 5, about 6 mm. long, the nectary scale attached usually almost to its apex, truncate or rounded; achenes 10–30, each 1.5 mm. long by 1.2 mm. dorsoventrally by about 0.5 mm. laterally; receptacle about 1 mm. long in fruit. Mountain meadows, Canadian and Hudsonian Zones; eastern peaks of the Cascade Mountains, Washington, high mountains of Oregon, Siskiyou Mountains, high North Coast Ranges, Sierra Nevada, San Bernardino, and San Jacinto Mountains, California. Type locality: Lake Tenaya, Yosemite National Park, California.

Ranunculus alismaefolius var. *Lemmönii* (A. Gray) L. Benson, Amer. Journ. Bot. 23: 172. 1936. Commonly pilose at least on the stems and petioles; stems decumbent, 1.5–3 dm. long, 1.5–3 mm. in diameter; radical leaves lanceolate, 3–9 cm. long by 5–10 mm. broad, entire; petals 5, 8–16 (mostly 10) mm. long, the nectary scale like the typical species; achenes about 20, each about 2 mm. long by 1.8 mm. dorsoventrally by about 0.8–1 mm. laterally, pubescent, glabrate, or glabrous, the beak 0.5–1 mm. long; receptacle pyriform, 2–5 mm. long in fruit. Transition Zone; valleys in the arid mountain region from Mount Lassen to Truckee, California. Type locality: Sierra Valley, California.

24. *Ranunculus orésterus* L. Benson. Blue Mountain Buttercup. Fig. 1845.

Ranunculus oresterus L. Benson, Amer. Journ. Bot. 26: 555. 1939.

Practically glabrous terrestrial perennials, the roots very numerous, filiform, 0.5–1 mm. in diameter, each root densely covered with hairs for its entire length; stems erect, not rooting, about 1 dm. long, 2–4 flowered, glabrous except for long appressed stout hairs at the bases. Radical leaf blades simple, each broadest at the middle and tapering to the acute ends, 2–4.5 cm. long by about 6–7 mm. broad, entire, glabrous, petioles 2–4 cm. long, stipular leaf base perhaps forming almost the entire petiole; cauline leaves alternate or almost opposite, sessile; sepals yellowish and petaloid, spreading, narrowly oblong, 3 mm. long by 1–1.5 mm. broad, the length of the petals; petals 5, yellow, narrowly oblong, 3 mm. long by 1–1.5 mm. broad, the nectary scale glabrous, apparently forming a pocket; stamens 5–10; achenes 15–25 in a depressed-globose head 2–4 mm. long by 2.5–4 mm. in diameter, each achene obovoid or oblong-obovoid, 1–1.5 mm. long by 0.7–1 mm. dorsoventrally by 0.7–0.8 mm. laterally, smooth, glabrous, the beak filiform, 0.4–0.6 mm. long, not curved; receptacle 1.5–2.5 mm. long in fruit, glabrous.

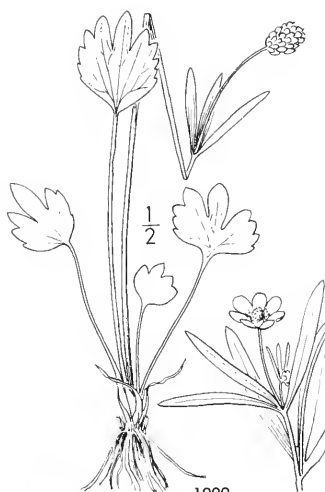
In swales at the summit of the Blue Mountains, altitude 1,300 meters, Baker–Canyon City Road, Oregon. Known only from the type collection and from a second collection in southern Idaho. May–June.

25. *Ranunculus hydrocharoides* A. Gray. Frog's-bit Buttercup. Fig. 1846.

Ranunculus hydrocharoides A. Gray, Mem. Amer. Acad. II. 5: 306. 1855.

Glabrous, aquatic perennial, the roots filiform, fascicled at the lower nodes; stems 10–25 cm. long, fistulose, inflated. Basal and cauline leaves alike, broadly ovate to suborbicular or elliptic, 1.5–3.5 cm. long, entire; sepals greenish yellow, spreading, ovate, half the length of the petals, early deciduous; petals 5, straw-yellow, narrowly obovate, about 5 mm. long; achenes 20–25 in a subglobose head 3–4 mm. long, rather well-compressed, 1 mm. long, margin distinctly visible, beak fleshy with a recurving, hook-like tip; receptacle short, very little enlarged in fruit.

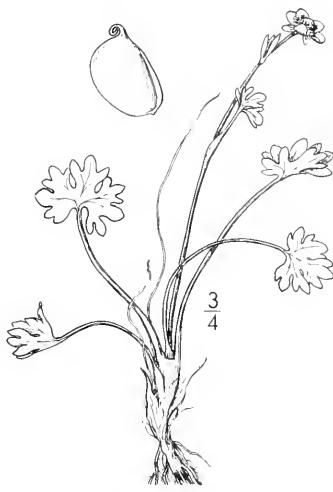
Owens Lake, California, eastern Arizona, southwestern New Mexico, and northwestern Mexico. Type locality: Mabibi, Sonora, Mexico. June–July.



1839



1840



1841



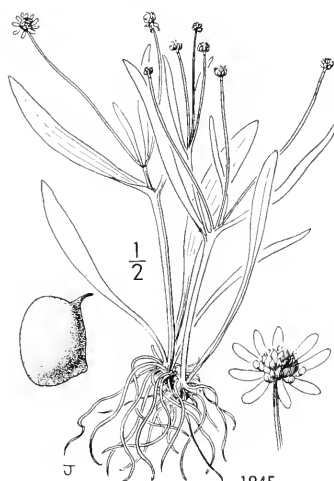
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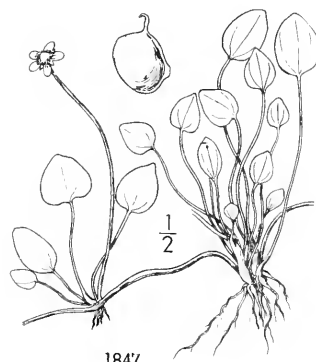
1844



1845



1846



1847

1839. *Ranunculus inamoenus*
 1840. *Ranunculus Eschscholtzii*
 1841. *Ranunculus verecundus*

1842. *Ranunculus glaberrimus*
 1843. *Ranunculus Flammula*
 1844. *Ranunculus alismaefolius*

1845. *Ranunculus oresterus*
 1846. *Ranunculus hydrocharoides*
 1847. *Ranunculus Gormanii*

26. *Ranunculus Gormanii* Greene. Gorman's Buttercup. Fig. 1847.

Ranunculus Gormanii Greene, Pittonia 3: 91. 1896

Ranunculus terrestris Wynd, Torreya 30: 53. 1930.

Glabrous perennial, the roots slender, each with a small, light-colored, fusiform base; stems prostrate, stolon-like, 1–2 dm. long, rooting at usually 2 or 3 nodes, filiform. Basal and cauline leaves alike, broadly ovate to deltoid-ovate, 20–30 mm. long, 15–22 mm. broad, entire, thin and flaccid, 3-nerved; pedicels terminal or nearly so; sepals spreading, ovate, 2–3 mm. long; glabrous; petals 5, bright straw-yellow, 5–6 mm. long; achenes 6–15, 1.5 mm. long, glabrous, smooth, somewhat compressed, slightly margined, beak evident, curved at the tip; receptacle short, not enlarged in fruit.

Boggy mountain streams and meadows, Hudsonian Zone; Cascade Mountains from the Three Sisters, Oregon, to the Siskiyou and Klamath Mountains, California; 2,000 meters elevation. Type locality: Crater Lake, Oregon. June–July.

27. *Ranunculus Populago* Greene. Cusick's Buttercup. Fig. 1848.

Ranunculus Populago Greene, Erythea 3: 19. 1895.

Ranunculus Cusickii M. E. Jones, Proc. Calif. Acad. II. 5: 615. 1895.

Flaccid and glabrous perennial, the roots fleshy, each with a light-colored, fusiform bulge at the base; stems 1 or 2, reclining or suberect, 1.4 dm. long. Basal leaves round-reniform to cordate-ovate or ovate, 3–5 cm. long by 3–6 cm. broad, denticulate, thin; cauline leaves opposite, rarely alternate, deltoid-ovate or ovate-lanceolate; sepals spreading, rounded, 2.5–4 mm. long; petals 5, yellow, narrowly obovate, 8 mm. long; achenes in a hemispherical head 3–4 mm. in radius, obovate, 1.5 mm. long, glabrous, beak straight, one-third the length of the body; receptacle short, a little enlarged in fruit.

Mountain meadows, Transition and Canadian Zones; Blue Mountains, Washington, mountains of Oregon, and the Siskiyou and Klamath Mountains south in the Sierra Nevada to Butte County, California, east to Idaho. Type locality: Blue Mountains, Oregon. June–July.

28. *Ranunculus pusillus* Poir. Low Buttercup or Spearwort. Fig. 1849.

Ranunculus pusillus Poir. in Lam. Encycl. 6: 99. 1804.

Ranunculus trachyspermus var. *Lindheimeri* Engelm. Bost. Journ. Nat. Hist. 5: 211. 1847.

Ranunculus pusillus var. *Lindheimeri* A. Gray, Proc. Amer. Acad. 21: 367. 1886.

Ranunculus Biolettii Greene, Pittonia 2: 225. 1892.

Glabrous palustrine annuals, the stems reclining, 1–5 dm. long, fistulous, rooting at the lower nodes. Basal and lower cauline leaves oblong to ovate or rarely cordate, 6–30 mm. long by 5–15 mm. broad, entire or undulate; upper cauline leaves linear to lanceolate or oblanceolate, sessile; sepals greenish yellow, ovate, 1–1.5 mm. long, glabrous or hairy; petals 1–3, obovate, 1–1.5 mm. long by 1 mm. broad, the nectary scale truncate; stamens 5–10; achenes 15–50 in an ovoid or hemispherical head 3–5 mm. long by 1–2 mm. in radius, bodies 1 mm. long, smooth or papillate, glabrous, style and achene beak 0.1–0.2 mm. long; receptacle enlarged in fruit, pyriform.

Shallow water of valleys, Transition Zone; Outer Coast Ranges from Humboldt County to the Santa Cruz Mountains and Napa County, California; also in the southern United States. Type locality: Carolina. April–May.

29. *Ranunculus alveolatus* Carter. Carter's Buttercup. Fig. 1850.

Ranunculus alveolatus Carter apud Benson & Carter, Amer. Journ. Bot. 26: 555. 1939.

Glabrous to sparsely pubescent semi-aquatic annual, the stems many-branched from near the base, rooting at the lower nodes, 12–30 cm. long. Leaves alternate, the blades simple, ovate to ovate-lanceolate, 6–20 mm. long by 4–12 mm. broad, entire to slightly dentate, petioles of the lower cauline leaves 30–85 mm. long, petioles of the upper cauline leaves 6–35 mm. long; stipular leaf bases membranous-margined, non-ciliate or slightly ciliate at the apices; sepals 3, membranous-margined at the bases, broadly ovate, 2–2.5 mm. long by 1–1.5 mm. broad; petals 2–3, yellow, ovate, 2–2.5 mm. long by 1 mm. broad, the nectary scale a glabrous pocket, truncate; stamens 4–5; achenes 15–25 in a slightly elongated head 3–5 mm. long by 3–4 mm. in diameter, each achene oval, flattened, 1.5 mm. long by 1.25 mm. dorsoventrally by 0.5 mm. laterally, the surface alveolate, the beak obscure; receptacle 2–3.5 mm. long by 1.25–1.5 mm. in diameter in fruit, glabrous.

Margins of ponds and marshy areas along small streams, Sierra Nevada foothills from Calaveras County to Placer County, California. Type locality: between Fair Oaks and Folsom, California. April–May.

30. *Ranunculus sceleratus* L. Cursed Buttercup or Crowfoot. Fig. 1851.

Ranunculus sceleratus L. Sp. Pl. 551. 1753.

Stems 1–10 dm. long, 2–15 mm. in diameter. Basal and cauline leaves reniform, 1–3 or 6 cm. long by 1.5–5 or 10 cm. broad, deeply 3-parted or -divided, the primary parts or divisions of the basal usually merely lobed, but sometimes parted or divided, the ultimate lobes obtuse, the sinuses rounded out; sepals spreading, at least three-fourths the length of the petals and often exceeding them; petals light yellow, 2–3 or 5 mm. long; achenes in a head 3 mm. long by 2 mm. in diameter up to 10 mm. by 7 mm., the body obovate, less than 1 mm. long, turgid, the pericarp transversely ridged.

Borders of lakes and marshland, Transition Zone; naturalized about Seattle and Portland and the islands of Puget Sound, also in eastern North America. Type locality: European. June–Aug.

Ranunculus sceleratus var. *multifidus* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 19. 1838. (*Ranunculus eremogenes* Greene, Erythea 4: 121. 1896.) Basal leaves usually with the primary parts or divisions deeply again parted or divided; pericarp smooth except for a circle of minute "pin-prick" depressions on each face. Along ditches and often brackish lakes. Transition and Upper Sonoran Zones; eastern Washington and Oregon to northeastern Siskiyou and Modoc counties, California, east to Great Basin and Great Plains. Type locality: Platte River.

31. *Ranunculus Púrshii* Richards. Pursh's Buttercup. Fig. 1852.

Ranunculus Purshii Richards. in Frankl. 1st Journ. Bot. App. ed. 2. 741. 1823.

Glabrous aquatic or palustrine perennial; lower nodes rooting; stems 1–3 dm. long. Leaves frequently all cauline, 1–2 cm. long by 1.5–2.5 cm. broad, deeply cordate, 3-divided, the lateral lobes forked, the outline hence pentagonal, petioles 1–3 or 4 cm. long; sepals 5, thick and heavy, spreading, round, glabrous; petals 5, yellow, little longer than the sepals, circular or obovate, 4–6 mm. long, nectary-scales variable; achenes 50–70 in an ovoid head 5–7 mm. long, turgid, ovate, 1–1.2 mm. long, smooth and glabrous, base with a suggestion of corky thickening beside the keel, beak flattened, but not winged; receptacle broadened and elongated in fruit.

Ponds and lakes. Transition Zone; Whatcom County and eastern Washington. Klamath Lake, Oregon, and Canada and the northern United States. Type locality: north-central Canada. June–July. This plant may be only a variety of the Asiatic species, *Ranunculus Gmelinii* DC., cf. L. Benson, Bull. Torrey Club 69: 313. 1942.

32. *Ranunculus flabellàris* Raf. Yellow Water Buttercup or Crowfoot. Fig. 1853.

Ranunculus multifidus Pursh, Fl. Amer. Sept. 2: 736. 1814. Not Forsk. 1775.

Ranunculus flabellaris Raf. Amer. Mo. Mag. 2: 344. March 1818.

Ranunculus delphinifolius Torr. in Eaton, Man. Bot. ed. 2. 395. May 1818.

Ranunculus delphinifolius f. *submersus* Gluck, Beihefte Bot. Cent. 39. abt. 2. 328. 1923.

Ranunculus delphinifolius f. *terrestris* Gluck, loc. cit.

Flaccid and glabrous aquatic perennial, the stems submerged, rooting below, about 40 cm. long, fistulose. Leaves all cauline, semicircular to reniform, 1.5–5 cm. long by 2–7 cm. broad, finely dissected, ultimate divisions 1 mm. broad; pedicels 4–10 cm. long; sepals deciduous in anthesis, one-half as long as the petals; petals 5–8, yellow, 8–15 mm. long, nectar pit in a pocket on the ventral side of the scale; achenes 50–75 in a nearly spherical or ovoid head 7–10 mm. long, bodies 1–1.8 mm. long, smooth and glabrous, heavily corky-margined at the bases; the beaks winged, as long as the bodies, sharply hooked at the tips; receptacle thickening and elongating in fruit.

Shallow water or mud. Transition Zone; British Columbia to eastern Washington and Oregon, the lower Columbia River, and Humboldt, Mendocino, and Modoc Counties, California; eastward to Ontario, Maine, and New Jersey, and south, in the Mississippi Valley to Louisiana. Type locality: Boston, Massachusetts. June–July. The form growing in mud is smaller and more compact, and the leaves are less dissected.

33. *Ranunculus Cymbalària* var. *saximontànus* Fernald. Desert Buttercup or Crowfoot. Fig. 1854.

Ranunculus tridentatus var. *major* H. B. K. in DC. Syst. 1: 253. 1818. Not *Ranunculus Cymbalaria* var. *major* Hook. f. & Thompson, 1855.

Ranunculus Cymbalaria var. *saximontanus* Fernald, Rhodora 16: 162. 1914.

Glabrous perennial, scapes 5–30 cm. long, stolons several dm. long. Basal leaves cordate, 15–25 mm. long by 12–20 or 25 mm. broad, shallowly crenately lobed; sepals 5, 3–8 mm. long, glabrous, thick; petals 5, yellow, 3–8 mm. long; stamens about 20; achenes 100–300 in a cylindrical head 5–10 mm. long and 3–5 mm. in diameter, body nearly oblong, the base truncate and narrower than the apex, 1.5 mm. long by 0.8 mm. broad, compressed, thin-walled, each face with about 4 longitudinal nerves or striations, the body produced into a deltoid beak 0.2 mm. long; fruiting receptacle much elongated, cylindrical.

Streams and springs and ocean inlets, mud or wet sand. Upper and Lower Sonoran Zones and sometimes Transition Zone; arid western America, Alaska to Mexico, east to Nebraska; coastal southern California. Type locality: Mexico. May–Sept.

34. *Ranunculus Coòleyae* Vasey & Rose. Cooley's Buttercup. Fig. 1855.

Ranunculus Cooleyae Vasey & Rose, Contr. U.S. Nat. Herb. 1: 289. pl. 22. 1893.

Kumlienia Cooleyae Greene, Erythea 2: 193. 1894.

Arcteranthis Cooleyae Greene, Pittonia 3: 190. pl. 3. 1897.

Glabrous perennial, caudex 1 cm. long, scapes simple, 3 dm. long, bearing a single scale leaf. Basal leaves reniform, 3-lobed, the lateral lobes dichotomously shallowly parted and lobed; sepals 5, yellow, petaloid, 7–9 mm. long by 5 mm. broad, glabrous; petals 7–16, yellow, 7–8 mm. long by 2 mm. broad, the claw 4 mm. long, narrow, margins rolled ventrally into the forked nectary scale whose margins flare into the blade; achenes 25–30, 2.5 mm. long by 1 mm. broad, 3-striate on each face, beak 1.3 mm. long, hooked at the tip; receptacle broad and convex in fruit.

Slopes near snow, Hudsonian Zone; Alaska to the mountains of western British Columbia and the Olympic Mountains, Washington. Type locality: Juneau, Alaska. July–Aug.

35. *Ranunculus hystrículus* A. Gray. Waterfall Buttercup. Fig. 1856.

Ranunculus hystriculus A. Gray, Proc. Amer. Acad. 7: 328. 1867.

Kumlienia hystricula Greene, Bull. Calif. Acad. 1: 337. 1886.

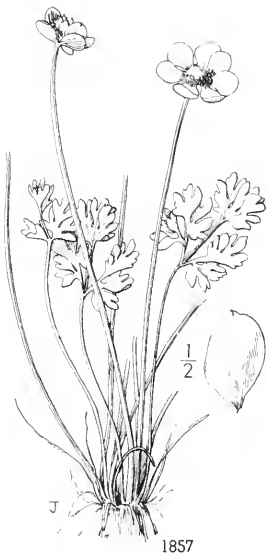
Glabrous perennial, caudex less than 1 cm. long, scapes simple or branched, bearing no or one



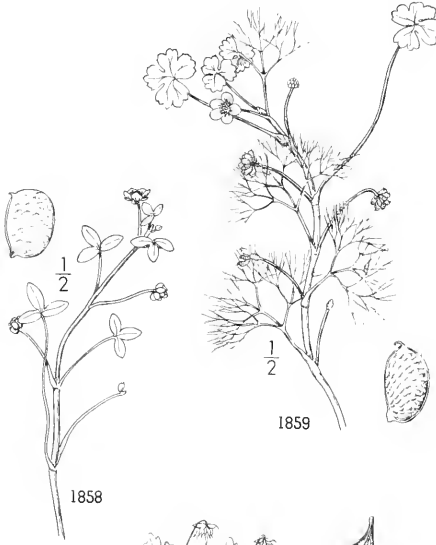
1848. *Ranunculus Populago*
1849. *Ranunculus pusillus*
1850. *Ranunculus alveolatus*

1851. *Ranunculus scleratus*
1852. *Ranunculus Purshii*
1853. *Ranunculus flabellaris*

1854. *Ranunculus Cymbalaria*
1855. *Ranunculus Cooleyae*
1856. *Ranunculus hystericulus*



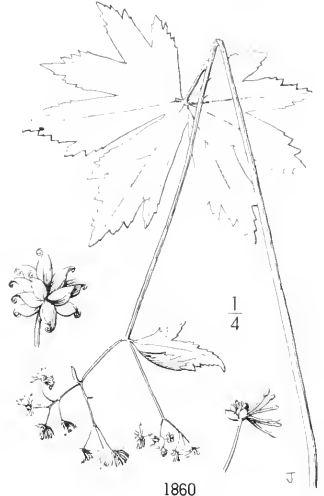
1857



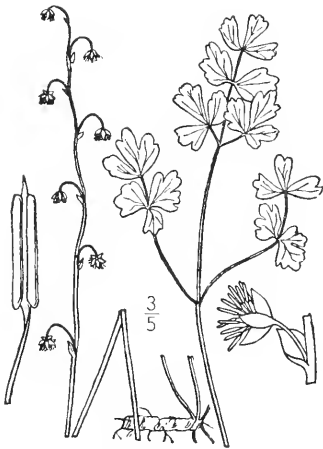
1858



1859



1860



1861



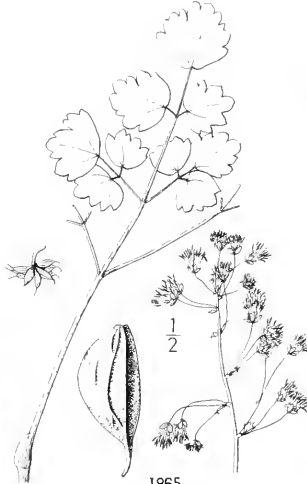
1862



1863



1864



1865



1866

1857. *Ranunculus Andersonii*
 1858. *Ranunculus Lobbii*
 1859. *Ranunculus aquatilis*

1860. *Trautvetteria carolinensis*
 1861. *Thalicttrum alpinum*
 1862. *Thalicttrum sparsiflorum*
 1863. *Thalicttrum occidentale*

1864. *Thalicttrum venulosum*
 1865. *Thalicttrum Fendleri*
 1866. *Thalicttrum polycarpum*

or two small leaves, 1.5–4 dm. long. Basal leaves semicircular or reniform, 2–4 mm. long by 3–5 mm. broad, 3-lobed, and again shallowly lobed; sepals 5, white, petaloid, 7–10 mm. long by 4–6 mm. broad, glabrous; petals 8–12, yellowish, almost lacking blades, the claws 2–3 mm. long, nectary scale forked; achenes 25–30, 3 mm. long by 1 mm. broad, 3-striate on each face, beak 1.3 mm. long, hooked at the tip; receptacle ovoid, very slightly elongated in fruit.

Moist places near streams, often about waterfalls, notably so at Yosemite Valley, Transition Zone; Butte County to Tulare County, California. Type locality: Forest Hill, Placer County. May–June.

36. *Ranunculus Andersøni* A. Gray. Anderson's Buttercup. Fig. 1857.

Ranunculus Andersonii A. Gray, Proc. Amer. Acad. 7: 327. 1867.

Beckwithia Austiniae Jepson, Erythra 6: 97. pl. 1. 1898.

Beckwithia Andersonii Jepson, Erythra 6: 99. 1898.

Wholly glabrous perennial, caudex 3–5 mm. long, stout, scapes usually simple. Basal leaves reniform, 2–3 mm. long by 2.5–4 mm. broad, pinnate, the 3 leaflets dissected into oblanceolate segments 7–8 mm. long by 2.5 mm. broad, thick; sepals 5, reddish, 7–8 mm. long by 5 mm. broad, marcescent-persistent in fruit; petals 5, red, cuneate, 15–19 mm. long by 5 mm. broad, edges of the nectary scale produced into ridges; fruits 15–25, utricular, appearing like sepals, 6–7 mm. long by 4–5 mm. broad, beak less than 1 mm. long, deltoid-curving, seed 4–5 mm. long by 1 mm. broad.

Rocky desert hillsides, Arid Transition and Upper Sonoran Zones; Great Basin Ranges from Lake and Malheur Counties, Oregon, to the Panamint Mountains, California, east to Idaho. Type locality: Blind Springs Mountain, near Carson City, Nevada. April–May.

37. *Ranunculus Lobbii* (Hiern) A. Gray. Lobb's Water Buttercup. Fig. 1858.

Ranunculus hydrocharis var. *Lobbii* Hiern, Journ. Bot. Brit. & For. 9: 66. pl. 114. 1871.

Ranunculus Lobbii A. Gray, Proc. Amer. Acad. 21: 364. 1886.

Batrachium Lobbii Howell, Fl. N.W. Amer. 1: 13. 1897.

Glabrous aquatic annual, stems 1–10 dm. long. Lower leaves submerged, 1–4 cm. long, triterately dissected into filiform divisions; upper leaves floating, divided into 3 equal elliptical, divergent lobes 5–8 mm. long by 2.5–5 mm. broad, the lateral lobes asymmetrically lobed at the apex; sepals 5, 2 mm. long; petals 5, white, 4–6 mm. long by 1.5–2.5 mm. broad, nectary naked; stamens 5–10; style filiform, 2–3 times as long as the ovary; achenes 4–6, obovate, 2.5 mm. long by 1.5 mm. broad, turgid, faces with short, rough, transverse ridges, glabrous, style deciduous; receptacle not enlarged in fruit, glabrous.

Shallow vernal pools, Transition Zone and border of the Upper Sonoran Zone; Vancouver Island, British Columbia, western Oregon, and California from Sonoma, Lake, and Solano Counties to the Santa Cruz Mountains and Alameda County. Type locality: Oregon. March–May.

38. *Ranunculus aquatilis* var. *capillaceus* (Thuill.) DC. Water Buttercup. Fig. 1859.

Ranunculus trichophyllus Chaix in Vill. Hist. Pl. Dauph. 1: 335. 1786.

Ranunculus capillaceus Thuill. Fl. Par. ed. 2. 1: 278. 1799.

Ranunculus aquatilis var. *capillaceus* DC. Prod. 1: 26. 1824.

Ranunculus aquatilis var. *brachypus* Hook. & Arn. Bot. Beechey 316. 1840.

Batrachium trichophyllum F. Schultz, Arch. Fl. France et All. 1: 107. 1848.

Ranunculus aquatilis var. *trichophyllus* A. Gray, Man. ed. 5. 40. 1867.

Batrachium Bakeri Greene, Leaflets Bot. Obs. 1: 95. 1904.

Batrachium pedunculare Greene, Leaflets Bot. Obs. 1: 95. 1904.

Ranunculus aquatilis var. *Bakeri* Jepson, Fl. Calif. 544. 1922.

Ranunculus aquatilis var. *peduncularis* Jepson, Fl. Calif. 544. 1922.

Ranunculus subrigidus W. Drew, Rhodora 38: 39. 1936.

Glabrous or hispidulous aquatic perennials, the stems submersed, rooting at the lower nodes, 2–6 or rarely 20 dm. long. Leaf blades all submersed and finely dissected into filiform divisions, usually collapsing when withdrawn from the water, 2–4 cm. long by 3–5 cm. broad; petioles 1–3 cm. long, stipular leaf bases 3–5 mm. long; pedicels stout, 1–3 cm. long; sepals light green, spreading, ovate, 2–3 mm. long by 1–1.8 mm. broad, glabrous, half the length of the petals; petals 5, white or the bases yellow, 4–8 mm. long by 1.5–2 mm. broad, the nectary scale glabrous, forming a shallow pocket; stamens 5 or 10–25; achenes usually 10–20 in a globose cluster, each achene obovoid, 1–1.5 or 2.5 mm. long by 1–1.5 mm. dorsoventrally by 0.5–0.7 mm. laterally, roughly transversely ridged, glabrous from the beginning or the pistils hispid and the achenes glabrate or with some hairs persisting on or near the dorsal sutures, the beaks about 0.3 mm. long; receptacle subglobose, 1 mm. long, densely pubescent.

Ponds, vernal pools, and running or sluggish streams, Upper Sonoran and sometimes Transition Zones; eastern Washington, eastern and western Oregon, and throughout California; widely distributed in North America. Type locality: European. March–June. The specimens from east of the Sierra Nevada have usually hairy achenes and so have some plants from middle California.

Ranunculus aquatilis var. *hispidulus* E. Drew, Bull. Torrey Club 16: 150. 1889. (*Ranunculus Grayanus* Freyn, Deutsch. Bot. Monatss. 8: 179. 1890. *Ranunculus trichophyllus* var. *hispidulus* W. Drew, Rhodora 38: 29. 1936.) Upper portion of the stem floating; floating leaves 1–10, simple, reniform, 0.5–1 cm. long by 1–3 cm. broad, 3-lobed or -parted, the lobes again forked or parted, the ultimate lobes rounded, the leaf proximally cordate and distally rounded, sometimes hispidulous dorsally; petals 4–6 mm. long. Ponds and ditches and vernal streams and pools at low elevations along the coast and up to 1,000 or 1,800 meters in the interior, Transition Zones; Pacific Slope from the Shumigan Islands, Alaska, south to Monterey and Mariposa Counties and at Cuyamaca Lake, San Diego County, California, east to Montana, Idaho, and Utah. Type locality: Jarnigan's, Humboldt County, California.

Ranunculus testiculatus Crantz, Stirp. Aust. fasc. 2: 97. 1763. Terrestrial; scapes less than 1 dm. tall, densely pilose; leaves all basal, the blade of each continued into a wing which extends the entire length of the petiole, 3-parted, the lateral segments cleft, the divisions linear; sepals narrowly elliptical, 3–5 mm. long, densely tomentose, acute, persistent in fruit; petals 5, yellow, 4–6 mm. long, oblanceolate; achenes about 30–50 in an elongated cylindrical spike, each achene beak lanceolate, about 4 mm. long by 1 mm. broad, densely tomentose, the body with two lateral empty vesicles. Introduced along roadsides in the sagebrush regions of eastern Washington, Oregon, Idaho, and Utah. Native of the Old World. Probably not distinct from *Ranunculus falcatus* L.

16. *TRAUTVETTÈRIA* Fisch. & Mey. Ind. Sem. Hort. Petrop. 1: 22. 1834.

Erect perennial herbs, the stems branching at the summit and forming corymbose cymes. Leaves palmately cleft and reticulate-veined, the basal ample and long-petioled, the cauline smaller, short-petioled or sessile. Sepals 3–5, concave, imbricated in the bud, greenish white, caducous. Petals none. Stamens numerous with conspicuous white clavate filaments. Achenes numerous, utricular, strongly nerved on each angle, abruptly tipped by the short recurved style. Seed basal and erect. [Name in honor of Prof. E. R. Trautvetter, a Russian botanist.]

A monotypic genus widely distributed over temperate North America and eastern Asia.

1. *Trautvetteria carolinensis* (Walt.) Vail. False Bugbane. Fig. 1860.

Hydrastis carolinensis Walt. Fl. Car. 156. 1788.

Cimicifuga palmata Michx. Fl. Bor. Amer. 1: 316. 1803.

Trautvetteria palmata Fisch. & Mey. Ind. Sem. Hort. Petrop. 1: 22. 1834.

Trautvetteria grandis Nutt. in Torr. & Gray, Fl. N. Amer. 1: 37. 1838.

Trautvetteria carolinensis Vail, Mem. Torrey Club 2: 42. 1890.

Trautvetteria fimbriata Greene, Leaflets Bot. Obs. 2: 190. 1912.

Trautvetteria rotundata Greene, Leaflets Bot. Obs. 2: 191. 1912.

Stems stout, 5–10 dm. high, glabrous or nearly so. Basal leaves long-petioled, 10–20 cm. broad, deeply 5–11-lobed, the lobes acute, coarsely and irregularly serrate-dentate; flowers in terminal cymose clusters; sepals 5–6 mm. long; filaments often 8–10 mm. long, about as broad as the anthers; achenes 3–4 mm. long.

Mountain streams, Boreal Zones; British Columbia south to the Olympic Mountains and through the Cascades to Trinity and Placer Counties, California, east to the Blue Mountains, Oregon, and across the continent; also in eastern Asia. Type locality: North Carolina. June–Aug.

17. *THALÍCTRUM* [Tourn.] L. Sp. Pl. 545. 1753.

Erect perennial herbs, some species ill-scented. Leaves ternately decompose, the cauline alternate. Flowers perfect, polygamous or dioecious, usually small, paniculate or racemose. Sepals 4 or 5, caducous, deciduous or persistent, green or petaloid. Petals none. Stamens many, exserted; filaments filiform or dilated above. Achenes usually few, stipitate or sessile, inflated in some species, longitudinally ribbed or nerved, or rarely merely reticulate-veined. [A Greek name for some unknown plant mentioned by Dioscorides.]

A genus of about 90 species, most abundant in the north temperate zone. Type species, *Thalictrum foetidum* L.

Flowers perfect.

Stem scapiform; flowers in a simple raceme; filaments filiform.

Stem leafy; flowers paniculate; filaments spatulate.

Flowers dioecious; filaments filiform.

Achenes distinctly 6–8-ribbed.

Achenes oblong-ovoid to spindle-shape, neither oblique nor compressed.

Leaves thin, not distinctly veined; achenes spindle-shape, 6–8 mm. long.

Leaves firm, distinctly veined; achenes oblong-ovoid, 4–5 mm. long.

Achenes obliquely obovoid and distinctly compressed.

Achenes thin-walled and turgid when fresh, becoming compressed and wrinkled when dry, merely reticulate-veined on the sides with only the mid-vein appearing as a rib.

1. *T. alpinum*.

2. *T. sparsiflorum*.

3. *T. occidentale*.

4. *T. venulosum*.

5. *T. Fendleri*.

6. *T. polycarpum*.

1. *Thalictrum alpinum* L. Arctic or Dwarf Meadow-Rue. Fig. 1861.

Thalictrum alpinum L. Sp. Pl. 545. 1753.

Thalictrum monoense Greene, Leaflets Bot. Obs. 2: 93. 1910.

Stems scapiform, 5–30 cm. high, simple, leafless or with a small leaf near the base, glabrous or slightly glandular. Leaves biternate, crowning a slender scaly rootstock; leaflets cuneate-obovate to orbicular, firm, 3–5-lobed, the margins revolute; flowers in a simple raceme, perfect; stamens 10, their filaments filiform, about equaling the sepals; achenes 3 mm. long, obliquely obovoid, sessile.

Alpine meadows, Boreal Zones; generally distributed in the arctic regions of North America and Eurasia. In the Pacific States known only from the White Mountains, California, but occurring also in the Rocky Mountains. Type locality: Europe. June–July.

2. *Thalictrum sparsiflorum* Turcz. Few-flowered Meadow-Rue. Fig. 1862.

Thalictrum sparsiflorum Turcz. in Fisch. & Mey. Ind. Sem. Hort. Petrop. 1: 40. 1834.

Stems leafy, 3–10 dm. high, branching above, glabrous. Leaves 2–3-ternate, the lower petioled,

the upper subsessile; leaflets 1–2 cm. long, cordate at base, usually 3-cleft and the divisions 3-lobed, glandular beneath with sessile glands, heavy-scented; flowers perfect; filaments spatulate; achenes half obovoid with a straight back, 5–6 mm. long, distinctly stipitate, rather faintly 3–4-nerved on each side, glandular.

Moist mountain meadows, Boreal Zones; arctic North America from Alaska to Hudson Bay, south to the high mountains of southern California, Idaho, Utah, and Colorado; also in Asia. In the Pacific States this species is frequent in the central and southern Sierra Nevada and San Bernardino Mountains, California, and the Gearhart Mountains, Oregon, but it has not been found in the Cascades nor in Washington. Type locality: Asia. June–July.

3. *Thalictrum occidentale* A. Gray. Western Meadow-Rue. Fig. 1863.

Thalictrum occidentale A. Gray, Proc. Amer. Acad. 8: 372. 1872.

Thalictrum dioicum var. *oxycarpum* Torr. Bot. Wilkes Exp. 212. 1874.

Stems simple or branching above, 3–10 dm. high, glabrous. Leaves 3–4-ternate; leaflets very thin, obovate-cuneate to orbicular, 1–3 cm. long, 3-lobed, the lobes coarsely crenate; filaments filiform; achenes narrowly spindle-form, tapering at both ends, not compressed, 6–8 mm. long, prominently 8–12-ribbed, the intervals shallow and without reticulations.

Moist thickets, Boreal Zones; British Columbia south through Washington and Oregon to northern California and east to Alberta, Montana, and Utah. Type locality: Vancouver Island. May–July.

4. *Thalictrum venulosum* Trelease. Veiny-leaved Meadow-Rue. Fig. 1864.

Thalictrum venulosum Trelease, Proc. Bost. Soc. Nat. Hist. 23: 302. 1886.

Thalictrum columbianum Rydb. Bull. Torrey Club 29: 320. 1912.

Stems 3–5 dm. high, mostly simple. Leaves 2–4-ternate, glabrous, leaflets cuneate to orbicular, 1–2 cm. long, thick and veiny, 3-lobed and deeply toothed; panicle rather narrow; achene narrowly ovoid, scarcely compressed, 4–5 mm. long, prominently ribbed with shallow or deeply grooved intervals.

Shady banks and in thickets bordering meadows, Arid Transition Zone; British Columbia, south through eastern Washington to northeastern Oregon, and east to South Dakota and Colorado. Type locality: only general range given. May–June.

5. *Thalictrum Fendleri* Engelm. Fendler's Meadow-Rue. Fig. 1865.

Thalictrum Fendleri Engelm. in A. Gray, Pl. Fendl. 5. 1849.

Thalictrum fissum Greene, Pittonia 4: 233. 1901.

Stem 3–8 dm. high. Leaves 3–4-ternate, the upper short-petioled or sessile; leaflets 1–2 cm. long, obliquely orbicular or subcordate, 3-lobed, the lobes crenate, puberulent and glandular beneath; inflorescence an open leafy panicle; filaments filiform; achenes obliquely obovate and more or less compressed, 3-nerved on each side, 4–5 mm. long, slightly puberulent and glandular.

Moist places usually near thickets, Boreal Zones; southeastern Oregon, western Nevada, and adjacent eastern California, to Wyoming, New Mexico, and Arizona. Type locality: mountains near Santa Fe, New Mexico. June–July. The plants from southeastern Oregon with scarcely compressed and less oblique achenes, which were described by Greene as *T. fissum*, suggest a transition between this species and *T. venulosum* Trelease.

Thalictrum Fendleri var. *platycarpum* Trelease, Proc. Bost. Soc. Nat. Hist. 23: 304. 1886. (*T. hesperium* Greene, Pittonia 2: 24. 1889.) Achenes larger, often 6 mm. long and 4 mm. broad, strongly oblique and flattened. Moist shaded slopes, Upper Sonoran and Arid Transition Zones; Sierra Nevada and South Coast Ranges, California, to northern Lower California.

6. *Thalictrum polycarpum* (Torr.) S. Wats. Many-fruited Meadow-Rue. Fig. 1866.

Thalictrum Fendleri var. *polycarpum* Torr. Pacif. R. Rep. 4: 61. 1857.

Thalictrum polycarpum S. Wats. Proc. Amer. Acad. 14: 282. 1879.

Thalictrum caesium Greene, Fl. Fran. 309. 1892.

Thalictrum ametrum Greene, Muhlenbergia 5: 129. 1909.

Plants usually robust, 6–12 dm. high, glabrous throughout. Leaves 3–4-ternate, the cauline short-petioled; leaflets mostly rounded or subcordate, 15–25 mm. long, thin, 3-lobed, the lobes toothed with rounded or acutish teeth; inflorescence usually ample, somewhat leafy below or often naked throughout; stamens filiform; achenes usually numerous forming a globular head, 5–6 mm. long, obovoid or nearly orbicular, vesicular at least when fresh, the seed not filling the cavity, the sides faintly reticulate, only the midrib forming a longitudinal rib.

Canyons and shaded slopes, Upper Sonoran and Transition Zones; Willamette Valley, Oregon, to northern Lower California. Type locality: Napa Valley, California, as designated by L. C. Wheeler, Rhodora 40: 319. 1938. April–June. Greene has proposed a number of segregates of this species, based chiefly on slight differences in foliage characters, but all exhibiting essentially the same distinctive fruit.

Family 47. BERBERIDACEAE.

BARBERRY FAMILY.

Shrubs or herbs with alternate or basal, simple or compound, usually exstipulate leaves. Flowers perfect, solitary or racemose, usually terminal. Sepals and petals hypogynous, imbricated in several series, often in threes. Stamens hypogynous, as

many as the petals and opposite them; anthers extrorse, opening by 2 uplifting valves. Pistil of a single carpel; style short or none; ovary 1-celled; ovules two to many, anatropous. Fruit a berry or capsule; endosperm present.

About 11 genera and 140 species, north temperate zone, extending to the Andes and the temperate zone of South America.

Shrubs with pinnate spiny-toothed leaves.

1. *Mahonia*.

Perennial herbs; leaves basal, mostly ternate.

Leaves with 3 sessile leaflets; sepals and petals none.

2. *Achlys*.

Leaves once or twice ternate; leaflets usually 3 to each division, petiolulate; sepals and petals present.

3. *Vancouveria*.

1. MAHONIA Nutt. Gen. Pl. 1: 211. 1818.

Shrubs with yellow wood, bitter inner bark, and spineless branches. Leaves persistent, pinnately compound, the leaflets coriaceous and spinose-dentate. Flowers yellow, racemose, the sepals and petals usually 3 each. Filaments dilated, usually with 2 tooth-like appendages at the apex, irritable, closing around the stigma when touched on the inner surface near the base. Stigma peltate. Fruit a berry, usually with a bloom, blue-black, varying to red or white. Seeds solitary or few. [Named in honor of Mr. Bernard McMahon, American horticulturist.]

About 35 species, natives of western North America and Asia. Type species, *Mahonia aquifolium* (Pursh) Nutt. *Odostemon* Raf. is an older name for this genus but *Mahonia* has been conserved by the International Botanical Congress.

Bud-scales glumaceous, persistent, 15–40 mm. long; filaments unappendaged.

1. *M. nervosa*.

Bud-scales deciduous, 2–5 mm. long; filaments with a pair of recurved teeth near the apex.

Racemes densely many-flowered; floral bracts triangular-ovate, obtuse or acute; berry oblong-ovoid, blue-black, fleshy.

Epidermis of the lower surface of the leaflets not papillate; upper surface bright glossy green.

Leaflets ovate, mostly obtuse, the lowest pair borne close to the base.

2. *M. pinnata*.

Leaflets ovate-lanceolate, the lowest pair remote from the base.

3. *M. aquifolium*.

Epidermal cells on the lower surface of the leaflets forming papilla-like protuberances.

Leaflets bright green and shining above.

Teeth 7–11 on each margin of the leaflet, tipped with slender spines; lower surface of leaflets gray-green.

4. *M. Piperiana*.

Teeth 12–16 on each margin, merely bristle-tipped; lower surface not grayed.

5. *M. Sonnei*.

Leaflets dull or gray-green above, grayish beneath.

Teeth small and merely bristle-tipped, usually 12 or more on a side.

6. *M. repens*.

Teeth large, tipped with stout spines, usually 5–9 on each margin.

Plants low, 2–5 dm. high; teeth not as long as the body portion of the leaflets.

7. *M. pumila*.

Plants 1–2 m. high; leaves pale gray-green on both surfaces, strongly undulate and rigid, the teeth about as long as the body portion of the leaflet.

8. *M. dictyota*.

Racemes loosely 5–7-flowered; floral bracts lanceolate-acuminate; leaves glaucescent on both surfaces; berries globose.

Leaflets with 2–3 prominent spiny teeth on each margin, deeply sinuate; berries inflated and dry.

9. *M. Fremontii*.

Leaflets narrow, long-acuminate, with 6 or more bristle-like teeth on each margin, only slightly or not at all sinuate; berries not inflated, bright red and juicy.

10. *M. Nevinii*.

1. *Mahonia nervosa* (Pursh) Nutt. Oregon Grape. Fig. 1867.

Berberis nervosa Pursh, Fl. Amer. Sept. 1: 219. pl. 5. 1814.

Mahonia nervosa Nutt. Gen. 1: 212. 1818.

Mahonia glumosa DC. Syst. 2: 21. 1821.

Odostemon nervosus Rydb. Bull. Torrey Club 33: 141. 1906.

Stems simple, 2–6 dm. high, bearing the leaves in a terminal tuft, the scales of the terminal bud glumaceous, persistent, 1.5–4 cm. long. Leaves 25–40 cm. long; leaflets 7–21, ovate to ovate-lanceolate, acute, 3–5 cm. long, spinulose-serrate, glossy green, somewhat palmately nerved; racemes 7–20 cm. long, erect; pedicels 5–8 mm. long; berries glaucous, blue, 8–10 mm. in diameter.

Coniferous forests, Humid Transition Zone; Vancouver Island and British Columbia to Monterey, California. Type locality: the Cascades of the Columbia River. March–May.

2. *Mahonia pinnata* (Lag.) Fedde. California Mahonia. Fig. 1868.

Berberis pinnata Lag. Elench. Hort. Madr. 6. 1803 (nomen nudum); op. cit. 14. 1816.

Mahonia fascicularis DC. Syst. 2: 19. 1821.

Mahonia pinnata Fedde, Bot. Jahrb. 31: 86. 1901.

Odostemon fascicularis Abrams, Bull. N.Y. Bot. Gard. 6: 360. 1910.

Stems erect, branching, 3–15 dm. high. Leaflets 5–17, commonly 7–9, crowded on the rachis, the lowest pair near the base, glossy green above, scarcely paler beneath, rather thin, spinulose-dentate, the teeth usually 12 or more on each margin; racemes dense, fascicled, 3–5 cm. long.

Wooded slopes or thickets, mainly Upper Sonoran Zone; California Coast Ranges from Humboldt County to Los Angeles County. Type locality: Monterey, California. March–May.

3. *Mahonia Aquifolium* (Pursh) Nutt. Holly-leaved Mahonia. Fig. 1869.

Berberis Aquifolium Pursh, Fl. Amer. Sept. 1: 219. 1814.

Mahonia Aquifolium Nutt. Gen. 1: 212. 1818.

Odostemon Aquifolium Rydb. Bull. Torrey Club 33: 141. 1906.

Odostemon nutkanus Rydb. loc. cit.

Stems erect, 8–20 dm. high, or sometimes dwarfed. Leaflets 5–9, the lower pair distant from the base of the rachis, ovate-lanceolate, 3–7.5 cm. long, with usually 10 or more small spinulose teeth on each margin, bright glossy green above, light green beneath; racemes fascicled, 4–8 cm. long; berries blue and glaucous, on pedicels 10–15 mm. long.

Coniferous woods, Humid Transition Zone; southwestern British Columbia to the Calipooia Mountains, Oregon, also in northwestern Idaho. Type locality: the Cascades of the Columbia River. March–May.

4. *Mahonia Piperiana* Abrams. Piper's Mahonia. Fig. 1870.

Mahonia Piperiana Abrams, Phytologia 1: 91. 1933.

Stems erect, 2–5 dm. high. Leaflets 5–9, commonly 7, the lower pair usually distant from the base of the rachis, ovate, 2.5–5 cm. long, spinose-dentate, with 7–9 teeth on each margin; upper surface glossy green and rather finely reticulate, the lower surface gray-green and papillate; racemes 3–7 cm. long, densely or rather loosely fascicled; berry blue-black, ellipsoid-ovoid.

Usually on thinly wooded slopes, Arid Transition Zone; Jackson and Josephine Counties, Oregon, to Mendocino and northern Lake Counties, California. Type locality: along the Pacific Highway, near the Siskiyou summit, Jackson County, Oregon. March–May.

5. *Mahonia Sonnei* Abrams. Sonne's Mahonia. Fig. 1871.

Mahonia Sonnei Abrams, Phytologia 1: 92. 1933.

Low shrub, 2–5 dm. high. Leaflets 5, ovate-lanceolate, 4–8 cm. long, glossy green above, pale beneath but not grayish or very obscurely so, the papillae being rather thinly scattered; racemes densely flowered, 4–7 cm. long; berries blue-black, about 6 mm. long.

Rocky slopes, Arid Transition Zone; eastern slopes of the Sierra Nevada, central California. Type locality: Truckee River, Nevada County, California. March–May.

6. *Mahonia repens* (Lindl.) G. Don. Creeping Mahonia. Fig. 1872.

Berberis repens Lindl. Bot. Reg. 14: pl. 1176. 1828.

Mahonia repens G. Don, Gen. Hist. Pl. 1: 118. 1831.

Odostemon repens Cockerell in Daniels, Fl. Boulder, Colo. 125. 1911.

Stems creeping and stoloniferous, 1–2 dm. high. Leaflets 3–7, oval or rarely ovate, 3–9 cm. long, plane or nearly so, dull green above, grayish green beneath and papillate with minute microscopic protuberances; teeth usually 12 or more on a side, small and merely bristle-tipped; racemes densely many-flowered; berry ellipsoid-globose, 7–8 mm. long.

Open pine forests, Arid Transition Zone; eastern British Columbia south along the eastern slopes of the Cascade Mountains to northeastern California, and east to Alberta, Nebraska, and New Mexico. Type locality: probably Montana. April–May.

7. *Mahonia pumila* (Greene) Fedde. Dwarf Mahonia. Fig. 1873.

Berberis pumila Greene, Pittonia 2: 161. 1891.

Mahonia pumila Fedde, Bot. Jahrb. 31: 82. 1901.

Odostemon pumilus Heller, Muhlenbergia 7: 139. 1912.

Stem erect, 2–4 dm. high, rarely higher, simple or branched; leaflets 5–9, broadly oblong-ovate, blunt at the apex, dull green and strongly reticulate-veined above, glaucous beneath, undulate and strongly spinose-dentate, the teeth 5–9 on each margin; racemes fascicled, many-flowered; berries blue-black with a bloom, oblong-ovoid, about 6 mm. long.

Wooded slopes, Upper Sonoran and Arid Transition Zones; Rogue River, southern Oregon, south in the North Coast Ranges and the Sierra Nevada, California. Type locality: near Waldo, Oregon. March–May.

Mahonia amplexans Eastw. Proc. Calif. Acad. IV, 20: 145. 1931. (*Berberis amplexans* L. C. Wheeler, Rhodora 39: 376. 1937.) Erect shrub, 3–6 dm. high. Leaflets 5–7, broadly oval to suborbicular, 3–5 cm. wide, dull grayish green above and prominently reticulate-veined, the margin more or less undulate and prominently spinose-dentate, the teeth 5–7 on a side; racemes fascicled, their main axis 12–25 mm. long; berries blue-black with a bloom, oblong-ovoid. Santa Rosa, Palomar, and Cuyamaca Mountains, southern California. An imperfectly known species closely related to *M. pumila*.

8. *Mahonia dictyota* (Jepson) Fedde. Jepson's Mahonia. Fig. 1874.

Berberis dictyota Jepson, Bull. Torrey Club 18: 319. 1891.

Mahonia dictyota Fedde, Bot. Jahrb. 31: 89. 1901.

Odostemon dictyota Cockerell, Bull. Amer. Mus. Nat. Hist. 24: 91. 1908.

Berberis californica Jepson, Fl. Calif. 549. 1922.

Erect shrub, 5–20 dm. high, rather sparsely leafy. Leaflets 5–7, broadly oblong to suborbicular in outline, strongly undulate and prominently spinose-toothed with 3–5 teeth on each margin, thick-coriaceous and prominently net-veined on both surfaces, pale green above and glaucous beneath; racemes fascicled; berries very glaucous, about 5 mm. long.

Dry chaparral ridges, Upper Sonoran Zone; California, from the dry interior foothills of the upper Sacramento Valley to San Diego County. Type locality: Marysville Buttes, California. March–April.

9. *Mahonia Fremontii* (Torr.) Fedde. Fremont's Mahonia. Fig. 1875.*Berberis Fremontii* Torr. Bot. Mex. Bound. 30. 1859.*Mahonia Fremontii* Fedde, Bot. Jahrb. 31: 89. 1901.*Odostemon Fremontii* Rydb. Bull. Torrey Club 33: 141. 1906.

Erect shrub, with rigid branches, 1–3 m. high. Leaflets 3–7, commonly 5, rather narrowly ovate, 15–25 mm. long, coriaceous, pale gray-green on both surfaces, the spiny teeth prominent, usually 3 on each side; racemes terminating the numerous short stubby branchlets; usually 3–5-flowered; bracts acuminate; pedicels slender, 10–16 mm. long; berries becoming more or less inflated and dry, 6–14 mm. in diameter; seeds 5–6 mm. long.

Dry mountain slopes of the desert regions, Upper Sonoran Zone; southern Nevada east to southern Colorado, south to northern Arizona, the desert ranges of southern California, and adjacent Lower California. Type locality: "On the tributaries of the Rio Virgin," southern Utah. May–June.

Mahonia haematocarpa (Wooton) Fedde, Bot. Jahrb. 31: 100. 1901. Plants collected near Dripping Springs, Riverside County, California, have been referred to this species, but they are not typical and must await good fruiting material before they can be satisfactorily determined. In foliage characters they are intermediate between *M. Fremontii* and *M. Nevinii*.

10. *Mahonia Nevinii* (A. Gray) Fedde. Nevin's Mahonia. Fig. 1876.*Berberis Nevinii* A. Gray, Syn. Fl. N. Amer. 1st: 69. 1895.*Mahonia Nevinii* Fedde, Bot. Jahrb. 31: 102. 1901.*Odostemon Nevinii* Abrams, Bull. N.Y. Bot. Gard. 6: 359. 1910.

Much branched shrub, 1–2 m. high. Leaflets 3 or rarely 5, lanceolate, the lateral 2–3 cm. long, the terminal often nearly twice as long, gray-green on both surfaces, spinulose-serrate, the teeth numerous, bristle-like; racemes terminating the numerous stubby branchlets, loosely 5–7-flowered; bracts acuminate; berries bright red or yellowish, juicy.

Dry sandy washes, Upper Sonoran Zone; a rare species, known only from the eastern end of San Fernando Valley, southern California. Feb.–March.

2. *ACHLYS* DC. Syst. 2: 35. 1821.

Perennial herbs with slender creeping rootstocks. Leaves basal, long-petioled, 3-foliate. Flowers perfect, bractless, in an erect spike terminating the scape. Calyx and corolla absent. Stamens 6–13; filaments elongated, filiform or the outer dilated upward. Ovary ovoid, with a broad sessile stigma; ovule solitary. Fruit somewhat fleshy, becoming dry and indehiscent, reniform, the dorsal side cartilaginous, the ventral concave, membranaceous with a fleshy central ridge. [Name from Achlus, the Greek god of night.]

A genus with two species, one in the Pacific States, the other in Japan. Type species, *Achlys triphylla* DC.

1. *Achlys triphylla* (Smith) DC. Vanilla-leaf, Deer-foot. Fig. 1877.*Leontice triphylla* Smith in Rees Cycl. 20: No. 5. 1812.*Achlys triphylla* DC. Syst. 2: 35. 1821.

Plants glabrous throughout. Leaf solitary, from a scaly base, 25–40 cm. high; leaflets spreading, broadly fan-shaped, 5–10 cm. long, coarsely sinuate-dentate, the two lateral ones suggesting the wings of a butterfly; scape equaling or exceeding the leaf; spike 2.5–5 cm. long; fruit with a reddish tinge, 3–4 mm. long.

Deep coniferous forests, Humid Transition Zone; British Columbia southward through western Washington and Oregon to Mendocino County, California. Type locality: collected by Menzies "on the west coast of America." April–July.

3. *VANCOUVÈRIA* Morr. & Dec. Ann. Sci. Nat. II. 2: 351. 1834.

Low fern-like perennial herbs with slender creeping rootstocks. Leaves basal, once or twice ternately compound, deciduous or persistent. Inflorescence an open panicle or raceme on a slender, scape-like peduncle, bearing small nodding flowers. Sepals 6, in 2 series, obovate, reflexed, petaloid, subtended by 6–9 small sepal-like bractlets and deciduous with them. Petals 6, reflexed, linear-spatulate, tipped with hood-shaped nectary. Stamens 6, erect, their filaments broad. Pistil 1, composed of 1 carpel; style slender; stigma cup-shaped; ovules 2–10, on the ventral suture. Fruit a 2-valved follicle. Seeds with a prominent fleshy aril. [Name in honor of Capt. George Vancouver, English explorer, who visited the coast of the Pacific States near the close of the 18th century in the ship "Discovery."]]

Three species inhabiting the Pacific States. Type species, *Vancouveria hexandra* (Hook.) Morr. & Dec. This genus is closely related to *Epimedium* L. of the Old World and is combined with it by some botanists.

Leaves deciduous; leaflets thin; panicles glabrous.

1. *V. hexandra*.

Leaves persistent; leaflets coriaceous; panicles glandular.

2. *V. chrysantha*.

Flowers yellow, 12–15 mm. long; filaments glandular-pubescent.

3. *V. planipetala*.

Flowers white, 7–8 mm. long; filaments glabrous.



1867. *Mahonia nervosa*
1868. *Mahonia pinnata*
1869. *Mahonia Aquifolium*

1870. *Mahonia Piperiana*
1871. *Mahonia Sonnei*
1872. *Mahonia repens*
1873. *Mahonia pumila*

1874. *Mahonia dictyota*
1875. *Mahonia Fremontii*
1876. *Mahonia Nevinii*

1. *Vancouveria hexándra* (Hook.) Morr. & Dec. Northern
Vancouveria. Fig. 1878.

Epimedium hexandrum Hook. Fl. Bor. Amer. 1: 30. pl. 13. 1829.

Vancouveria hexandra Morr. & Dec. Ann. Sci. Nat. II. 2: 351. 1834.

Scapes glabrous above, pilose at base, usually exceeding the leaves. Leaves 1–4 dm. long, deciduous, petioles slender; leaflets 3-lobed, cordate at base, broadly ovate in outline, 2–6 cm. long, thin, light green above, paler beneath and sparsely pubescent; pedicles recurved, 3–4 cm. long; flowers white; sepals and bractlets about 6 mm. long; filaments glandular-pubescent; body of the follicle 8–10 mm. long, 6-seeded.

Coniferous woods, usually in deep shade, Humid Transition Zone; valley of the Nesqually River, Washington, to Mendocino County, California. Type locality: Northwest Coast, collected by Menzies, the physician and naturalist of the Vancouver expedition, May–June. In 1914 Greene (Rep. Spec. Nov. 13: 323) proposed three segregates: *V. brevicula*, *V. parvifolia* and *V. picta*, based on trivial characters.

2. *Vancouveria chrysántha* Greene. Yellow Vancouveria. Fig. 1879.

Vancouveria chrysantha Greene, Bull. Calif. Acad. 1: 66. 1885.

Vancouveria hexandra var. *chrysantha* Greene, Pittonia 2: 100. 1890.

Scapes and petioles glandular-pilose. Leaves ternate, persistent; leaflets 15–25 mm. long, broadly ovate in outline, more or less 3-lobed, cordate at base, coriaceous, glossy green above, pale, reticulate and pubescent beneath, the margins cartilaginous; flowers yellow; sepals about 10 mm. long; filaments and ovary glandular-pubescent.

A local species known only from the Siskiyou Mountains, Josephine County, Oregon. Type locality: "Coast mountains of Oregon, on about the forty-second parallel." May–June.

3. *Vancouveria planipétala* Calloni. Small-flowered Vancouveria. Fig. 1880.

Vancouveria planipetala Calloni, Malpighia 1: 266. 1887.

Vancouveria parviflora Greene, Pittonia 2: 100. 1890.

Vancouveria chrysantha var. *parviflora* Jepson, Fl. W. Mid. Calif. 204. 1901.

Scapes 2–5 dm. high, usually exceeding the leaves, very sparsely pilose. Leaves persistent, ternate; leaflets 15–25 mm. long, usually broader than long, more or less 3-lobed, glossy green above, pale, scarcely reticulate and glabrous beneath; inflorescence glandular-pubescent; flowers white; sepals about 4–5 mm. long; filaments and ovary glabrous; body of the follicle about 3 mm. long, 2–3-seeded.

Woods, Humid Transition Zone; Siskiyou Mountains, Del Norte County, to the Santa Lucia Mountains, California. Type locality: Redwoods, Marin County, California. April–June. Greene (Rep. Spec. Nov. 13: 321–322. 1914) segregated three species, *concolor*, *crispa* and *Vaseyi*, based upon characters of very uncertain specific value.

Family 48. CALYCANTHACEAE.

CALYCANTHUS FAMILY.

Aromatic shrubs with opposite, entire, short-petioled leaves. Stipules none. Flowers large, solitary and terminal, fragrant. Sepals and petals several, imbricated in several series. Stamens many, inserted on the receptacle, the inner sterile. Pistils many, enclosed in the hollow receptacle; ovary 1-celled; ovules 1 or 2; style filiform. Fruit consisting of the enlarged ovoid receptacle, enclosing few to many smooth, shining achenes. Seed erect, without endosperm; cotyledons foliaceous, convolute.

A small family composed of 2 genera, one North American the other Asiatic, with about 6 species.

1. *CALYCÁNTHUS* L. Syst. Nat. ed. 10, 1066. 1759.

Flowers purple or red. Stamens inserted in several rows. [Name Greek, meaning cup-flower.]

A genus of 4 species, 3 in the southeastern United States and 1 in California. Type species, *Calycanthus floridus* L.

1. *Calycanthus occidentális* Hook. & Arn. Western Sweet-scented
Shrub. Fig. 1881.

Calycanthus occidentalis Hook. & Arn. Bot. Beechey 340. pl. 84. 1840.

Butneria occidentalis Greene, Erythea 1: 207. 1893.

Erect branching shrub, 1–3 m. high, the foliage pleasantly aromatic when bruised. Leaves 7–10 cm. long, ovate to oblong-lanceolate, acute at the apex, rounded or cordate at base, very short-petioled, deciduous, firm in texture, dark glossy green and scabrous; flowers solitary, pedunculate; sepals and petals 2–6 cm. long, linear-spatulate, reddish purple, emitting the odor of wine; sterile filaments densely villous; fruiting hypanthium ovoid, but slightly constricted at the apex, 25–35 mm. long; achenes numerous, oblong, 7–8 mm. long, villous.

Moist places, along streams and borders of lakes and ponds, Upper Sonoran and Arid Transition Zones; California, in the North Coast Ranges and the Sierra Nevada foothills. Type locality: collected by Douglas in the North Coast Ranges. May–Sept.

Family 49. **LAURACEAE.**
LAUREL FAMILY.

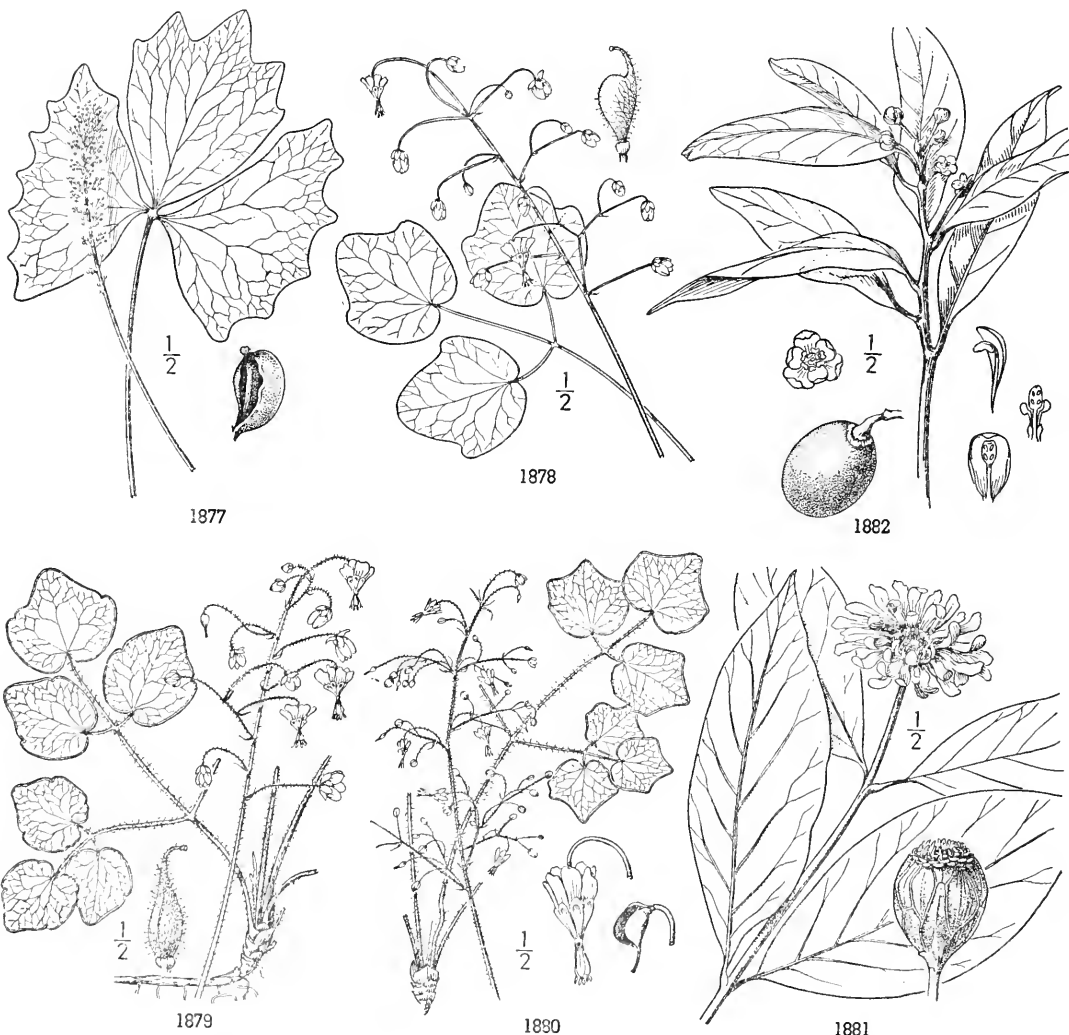
Aromatic trees and shrubs with alternate, entire, minutely punctate leaves, without stipules. Flowers perfect or unisexual, apetalous, arranged in panicles, racemes or umbellate clusters. Calyx 4-6-parted, its petaloid segments in 2 series. Stamens in 3-4 series, some of them often reduced to staminodia; anthers 2-4-celled, opening by 4 uplifting valves. Pistil 1, unicarpellate, free from the calyx; ovary 1-celled; style and stigma 1; ovule 1, pendulous. Fruit a drupe with a smooth stone.

A family of about 50 genera and 1,000 species, chiefly tropical.

1. **UMBELLULÀRIA** Nutt. N. Amer. Sylva 1: 87. 1842.

A tree with thick evergreen leaves and small greenish-yellow flowers in axillary or terminal, umbellate clusters, included before anthesis in an involucre of 4 deciduous bracts. Calyx 6-parted, deciduous. Stamens 9, in 3 series of 3 each, with a fleshy 2-lobed stipitate gland at base and alternating with 3 staminodia; anthers 4-valved, the outer introrse, the inner extrorse. Stigma dilated. Drupe subglobose to ovoid, subtended by the thickened base of the calyx. [Name Latin, meaning a little umbel.]

A monotypic genus peculiar to Pacific North America.



1877. *Achlys triphylla*

1878. *Vancouveria hexandra*

1879. *Vancouveria chrysantha*

1880. *Vancouveria planipetala*

1881. *Calycanthus occidentalis*

1882. *Umbellularia californica*

1. *Umbellularia californica* (Hook. & Arn.) Nutt. California Laurel. Fig. 1882.

Tetranthera californica Hook. & Arn. Bot. Beechey 159. 1833.

Oreodaphne californica Nees, Syst. Laurin. 463. 1836.

Umbellularia californica Nutt. N. Amer. Sylva 1: 8. 1842.

A handsome tree, 20–30 m. high, with a trunk up to 2.5 m. in diameter, the bark dark brown, about 2 cm. thick. Leaves oblong-lanceolate, 3–8 cm. long, 15–30 mm. wide, short-petioled, persisting for two or three years, emitting a strong pungent odor when bruised; flowers 6–10 on each peduncle; sepals 6–8 mm. long, oblong-ovate; drupes usually solitary, becoming dark purple, with thin pulp and large ellipsoid smooth thin-walled stone.

Canyon slopes and alluvial valleys, Transition and Upper Sonoran Zones; Umpqua River, Oregon, to San Diego County, California. Type locality: collected by Menzies, probably in the vicinity of San Francisco or Monterey. Jan.–April. Known also as Bay Tree, Pepperwood, Oregon Myrtle.

Family 50. **PAPAVERÀCEAE.**

POPPY FAMILY.

Herbs or rarely shrubs, with white, yellow or colorless sap. Leaves alternate or the upper sometimes opposite, exstipulate. Flowers regular, perfect, solitary or clustered, hypogynous but in *Eschscholzia* the receptacle expanded into a funnellform hypanthium-like structure on the rim of which are borne the perianth and stamens. Sepals 2, rarely 3 or 4, distinct or united into a calyptra, caducous. Petals 4 or 6, or rarely none, imbricated, deciduous. Stamens few or more commonly numerous, hypogynous, distinct; anthers opening by longitudinal slits. Pistil with 2 to several carpels united into a 1- to several-celled ovary, rarely only loosely united and becoming distinct in fruit; style short or none; stigma simple or divided; ovules usually many, on parietal placentae, anatropous. Fruit a capsule, generally dehiscent by pores or valves.

A family of 23 genera and about 120 species, most abundant in western North America.

Leaves mainly opposite or whorled and entire.

Stamens numerous; carpels 9–18, separating and torulose in fruit; petals tardily deciduous.

1. *Platystemon*.

Stamens 6–12; carpels 3, rarely 4, united into a 3-lobed or nearly terete ovary; petals early deciduous.

2. *Meconella*.

Leaves alternate, toothed or lobed except in *Canbya* and *Dendromecon*.

Plants tall, shrubby at least at base.

Flowers white, very large; leaves lobed; capsule ovoid.

3. *Romneya*.

Flowers yellow; leaves entire; capsule linear.

4. *Dendromecon*.

Plants herbaceous.

Perianth and stamens borne on the rim of the hypanthium-like expansion of the receptacle; sepals united into a calyptra.

5. *Eschscholzia*.

Perianth and stamens strictly hypogynous; sepals not united into a calyptra.

Stamens numerous.

Capsule 2-celled and bicarpellary, long-linear, dehiscent the entire length.

6. *Glaucium*.

Capsule 1-celled, composed of several carpels, ovoid.

Herbage not prickly or long-villous; capsules dehiscent by means of small openings just beneath the truncate summit.

Ovary and capsule tipped by the slender style terminating in the small globose stigma.

7. *Meconopsis*.

Ovary and capsule capped by the flat sessile circular disk of radiating stigmas.

8. *Papaver*.

Herbage prickly or long-villous; capsules dehiscent from the apex by 4–6 valves.

Plants more or less prickly.

9. *Argemone*.

Plants more or less densely long-villous.

10. *Arctomecon*.

Stamens 6–9; minute desert annual.

11. *Canbya*.

1. **PLATYSTÈMON** Benth. Trans. Hort. Soc. Lond. II. 1: 405. 1835.

Low villous annuals with entire, mainly opposite leaves and cream-colored flowers. Sepals 3, distinct. Petals 6, tardily deciduous. Stamens many, with flattened filaments and linear anthers. Carpels 6–25, at first united, becoming separate in fruit; stigmas linear, free. Fruit composed of linear torulose 3–8-seeded pods, indehiscent, but at length breaking transversely between the seeds. [Name Greek, meaning broad stamen, in reference to the dilated filaments.]

A monotypic genus of western North America.

1. *Platystemon californicus* Benth. Cream Cup. Fig. 1883.

Platystemon californicus Benth. Trans. Hort. Soc. Lond. II. 1: 405. 1835.

Stems slender, branching from the base and more or less decumbent, 15–30 cm. long,

pilose. Leaves 5–8 cm. long, broadly linear, sessile or clasping; peduncles erect, 8–20 cm. long; sepals villous, forming spherical or oblong-ovoid buds; petals 6–20 mm. long, cream-colored, sometimes yellow at the base; carpels 6–25, forming an oblong head, beaked by the persistent styles.

Valleys and foothills, especially in sandy soil, Upper Sonoran Zone; Coos County, Oregon, to northern Lower California, east to Utah and Arizona. Type locality: California, collected by Douglas. March–June.

Platystemon californicus var. *crinitus* Greene, Fl. Fran. 282. 1892. Peduncles, sepals and often the leaves densely pilose; petals usually yellow. Tehachapi Mountains, California, southward along the desert slopes to northern Lower California.

Platystemon californicus var. *horridulus* (Greene) Jepson, Fl. Calif. 556. 1922. Petals nearly rotate-spreading from a turbinate base, 6–8 mm. long; carpels usually densely covered with stiff hairs when young. Foothills of the southern Sierra Nevada, California.

Greene and later Fedde have proposed numerous segregates, the latter recognizing as many as 57 species, but the characters relied upon are too trivial and inconstant for specific or even varietal segregation.



1883. *Platystemon californicus*
1884. *Meconella linearis*

1885. *Meconella oregana*
1886. *Meconella denticulata*

1887. *Meconella californica*
1888. *Romneya Coulteri*

2. **MECONÉLLA** Nutt. in Torr. & Gray, Fl. N. Amer. 1: 64. 1838.
(*Platystigma* Benth. 1834. Not R. Br. 1832.)

Low slender annuals with opposite leaves. Sepals 3, rarely 2. Petals 6, rarely 4, deciduous. Stamens 6–12, or sometimes numerous, the filaments filiform or nearly so. Ovary 1-celled, with 3 parietal placentae, somewhat 3-lobed or nearly terete; stigma ovoid to subulate. Capsule 3-valved, dehiscent through the placentae. [Name Greek, meaning a little poppy.]

A genus of 4 species, natives of Pacific North America. Type species, *Meconella oregana* Nutt.

Leaves all basal; peduncles scapose; capsule obovoid.

1. *M. linearis*.

Leaves basal and on the slender branches; capsule linear.

Stamens 4–6, in one series; petals 4–5 mm. long.

Anthers much shorter than the filaments, less than 0.5 mm. long.

2. *M. oregana*.

Anthers nearly equaling the filaments.

3. *M. denticulata*.

Stamens 12, rarely 8, in two series; petals 8–10 mm. long.

4. *M. californica*.

1. **Meconella lineàris** (Benth.) A. Nels & Macbr. Narrow-leaved
Meconella. Fig. 1884.

Platystigma lineare Benth. Trans. Hort. Soc. Lond. II. 1: 407. 1835.

Hesperomecon lineare Greene, Pittonia 5: 146. 1903.

Meconella linearis A. Nels. & Macbr. Bot. Gaz. 61: 31. 1916.

Plants acaulescent or nearly so, hirsute with spreading hairs. Leaves all basal, linear, 2–8 cm. long; peduncles scape-like, 6–25 cm. high; petals obovate, 5–15 mm. long, cream-colored or often lemon yellow at base; stamens many; filaments linear or dilated; capsule obovoid or clavate-obovoid, somewhat 3-lobed; stigma triangular-lanceolate.

Grassy slopes, Upper Sonoran and Transition Zones; Siskiyou County, California, southward, chiefly in the coastal region, to Santa Barbara, California. Type locality: California. March–May.

Meconella linearis var. *pulchella* (Greene) Jepson, Fl. Calif. 556. 1922. Outer petals lemon yellow, the inner cream-colored. This seems to be no more than a color form and scarcely worthy of varietal rank. It was first collected at Fort Ross and has been found as far south as the Tehachapi Mountains, California.

2. **Meconella oregàna** Nutt. Oregon *Meconella*. Fig. 1885.

Meconella oregana Nutt. in Torr. & Gray, Fl. Amer. 1: 64. 1838.

Platystigma oreganum Benth. & Hook. ex Brewer & Wats. Bot. Calif. 1: 20. 1876.

Platystemon oreganus Curran, Proc. Calif. Acad. II. 1: 242. 1888.

Plants glabrous, 3–12 cm. high, with slender, spreading branches. Basal leaves subulate or obovate, short-petioled, 8–20 mm. long, the upper sessile and shorter; peduncles very slender, elongated; petals 4–6, 3–5 mm. long, white; anthers scarcely 0.5 mm. long, much shorter than the filaments; capsule linear, often twisted, 15–20 mm. long.

Open places in moist sandy or gravelly soil, Humid Transition Zone; British Columbia to southern Oregon. Type locality: near the mouth of Willamette River, Oregon. April–May.

3. **Meconella denticulàta** Greene. Small-flowered *Meconella*. Fig. 1886.

Meconella denticulata Greene, Bull. Calif. Acad. 2: 59. 1886.

Platystigma denticulatum Greene, Bull. Torrey Club 13: 218. 1886.

Meconella kakoethes Fedde, Rep. Nov. Spec. 3: 275. 1907.

Meconella oregana var. *denticulata* Jepson, Fl. Calif. 559. 1922.

Slender glabrous annual, 10–25 cm. high, with slender spreading branches and elongated, almost filiform peduncles. Basal leaves 25–40 mm. long, spatulate, with elongated winged petioles, the upper mostly linear and sessile; petals white, 3–4 mm. long; stamens 6, in one series; anthers 1 mm. long, about equaling the filaments; capsule narrowly linear, often twisted, 25–35 mm. long.

Moist shady banks, Upper Sonoran Zone; California Coast Ranges from Monterey County to San Diego County. Type locality: Temecula Canyon, San Diego County, California. March–May.

4. **Meconella califórnicà** Torr. California *Meconella*. Fig. 1887.

Meconella californica Torr. in Frem. Second Rep. 312. 1845.

Platystigma californicum Benth. & Hook. in Brewer & Wats. Bot. Calif. 1: 20. 1876.

Platystemon Torreyi Greene, Fl. Fran. 283. 1892.

Meconella octandra Greene, Pittonia 5: 142. 1903.

Meconella collina Greene, Pittonia 5: 143. 1903.

Meconella oregana var. *californica* Jepson, Fl. Calif. 559. 1922.

Slender erect branching annual, 1–2 dm. high. Basal leaves spatulate, 10–25 mm. long, with winged petioles, the upper shorter, oblanceolate to linear; petals cream-colored, oblong to narrowly obovate, 5–10 mm. long; stamens 12 in two unequal series; anthers much shorter than the filaments; capsules linear, twisted when mature, 15–35 mm. long.

Open hillsides, Upper Sonoran Zone; Sierra Nevada foothills, and in the San Francisco Bay region, California. Type locality: American River, California. March–May.

The plants in the San Francisco Bay region often have some of the filaments dilated. These forms represent *M. collina* Greene. In the southern Sierra Nevada, the plants have broader petals and sometimes only 8 stamens. They are *M. octandra* Greene.

3. RÓMNEYA Harv. Lond. Journ. Bot. 4:75. *pl.* 3. 1845.

Erect glaucescent perennial, branching from a half-woody base, with colorless sap, pinnately divided leaves and very large white flowers. Sepals 3. Petals 6. Stamens numerous, the filaments somewhat flattened below, the anthers oblong, yellow. Ovary oblong, densely setose, more or less completely several-celled by the intrusion of the many-ovuled placentae. Valves 7–12, opening from the summit downward. Seeds finely tuberculate. [Name in honor of the astronomer, T. Romney Robinson.]

A monotypic California genus.

1. *Romneya Coulteri* Harv. Matilija Poppy. Fig. 1888.

Romneya Coulteri Harv. Lond. Journ. Bot. 4: 75. 1845.

Stems herbaceous, stout, from a woody base, branching and forming a rounded clump 1–2.5 m. high. Leaves scattered, firm in texture, 6–12 cm. long, lobed or divided into 3–9 divisions, these cuneate-oblong or lanceolate, dentate, the margins and rachis often sparsely ciliate; flowers terminating the branches; sepals smooth, beaked; petals white, broadly obovate or orbicular, 4–6 cm. long, delicate and crepe-like.

Arroyos and canyon floors, Upper Sonoran Zone; Santa Barbara County to San Diego County, California. Type locality: collected by Coulter, but definite locality not known. April–Aug.

Romneya Coulteri var. *trichócalyx* (Eastw.) Jepson, Fl. Calif. 563. 1922. Differs from the typical species in having setose-hispid and beakless sepals. Ventura County, California, to northern Lower California.

4. DENDROMÈCON Benth. Trans. Hort. Soc. Lond. II. 1: 407. 1835.

Smooth branching shrubs, with alternate, vertical, rigid, entire or ciliate-denticulate leaves and showy yellow flowers. Sepals 2. Petals 4, yellow. Stamens numerous, with short filiform filaments and linear anthers. Ovary linear, 1-celled, with 2 nerve-like placentae. Capsule elongated, elastically 2-valved from the base upward. Seeds obovoid or globose, finely pitted, carunculate at the hilum. [Name Greek, meaning tree and poppy.]

A California genus of two species.

Leaves lanceolate, conspicuously reticulate.

1. *D. rigida*.

Leaves elliptic to oblong-ovate, not conspicuously reticulate.

2. *D. Harfordii*.

1. *Dendromecon rigida* Benth. Tree Poppy. Fig. 1889.

Dendromecon rigida Benth. Trans. Hort. Soc. Lond. II. 1: 407. 1835.

Erect shrub, 1–3 m. high, with slender, mostly erect branches and light-colored shreddy bark. Leaves lanceolate and cuspidate-acuminate, varying to oblong and obtuse, 2–6 cm. long, pale or glaucescent, vertical by a twist of the petiole; flowers on terminal or axillary peduncles; petals bright yellow, 15–30 mm. long; capsule 4–6 cm. long, arcuate, strongly striate.

Dry chaparral ridges, often abundant after fires, Upper Sonoran Zone; Coast Ranges and the Sierra Nevada of northern California to northern Lower California. Type locality: California. April–July.

Considerable variation is manifest in the size and shape of the leaves and to a less extent in the flowers, which led Greene (Pittonia 5: 296–306. 1905) to recognize seventeen species, and Fedde (Pflanzenreich 4104: 136–143. 1909) to increase the number to twenty.

2. *Dendromecon Harfordii* Kell. Island Tree Poppy. Fig. 1890.

Dendromecon Harfordii Kell. Proc. Calif. Acad. 5: 102. 1873.

Dendromecon flexile Greene, Bull. Torrey Club 13: 216. 1886.

Dendromecon rigida var. *Harfordii* K. Brandg. Zoe 4: 83. 1893.

Erect shrub or tree 2–6 m. high, the branches spreading, or even drooping, forming a rounded crown. Leaves pale, elliptic to oblong-ovate, 3–6 cm. long, entire, reticulations of the surface usually not conspicuous; peduncles not exceeding the leaves; petals 2–4 cm. long; capsule 7–10 cm. long, arcuate.

Brushy slopes, Upper Sonoran Zone; Channel Islands, California. Type locality: Santa Rosa Island, California. April–July.

5. ESCHSCHÖLZIA Cham. in Nees, Hor. Phys. Ber. 73. 1820.

Smooth glaucous annual or perennial herbs, with colorless sap, ternately dissected leaves and bright orange or yellow flowers. Receptacle dilated, forming a funnel-shaped torus around the base of the pistil. Sepals 2, borne on the torus, coherent into a pointed hood-like calyptra and pushed off by the expanding petals. Petals normally 4, rarely 6 or 8, stamens numerous, with short filaments and linear anthers. Ovary cylindric, 1-celled, with 2 nerve-like placentae; styles short; stigma divided into 4–6 linear divergent lobes. Capsule elongated, 10-nerved, dehiscent from the base and separating from the placentae. Seeds globose, reticulate or rough-tuberculate. [Name in honor of Dr. J. F. Eschscholtz, German poet and naturalist who together with Chamisso was on the Romanzoff Expedition to the Pacific Coast.]

A genus of about 12 species, natives of western North America. Type species, *Eschscholzia californica* Cham. The original spelling *Eschscholzia* instead of *Eschscholtzia* has been retained in conformity with the International Rules, and has been done so under the advice of the American representative of the international committee.

Torus with two rims, the inner erect and hyaline, the outer spreading; seeds reticulate; cotyledons 2-cleft; perennials or sometimes annuals. 1. *E. californica*.

Torus with only an erect hyaline rim, the outer rim absent or rudimentary; cotyledons entire; annuals.

Stems leafy or sometimes scapose; seeds reticulate or sometimes nearly smooth.

Herbage glabrous or sparsely puberulent.

Petals 10–25 mm. long.

Leaves not conspicuously glaucous; stem usually scapose.

Leaves conspicuously glaucous; stems leafy.

Petals 3–5 mm. long, rarely longer.

Herbage canescent with short curved hairs.

Stems scapose; seeds muricate or deeply pitted, not reticulate.

Leaf divisions short and crowded; seeds rather remotely pitted.

Leaf divisions few and elongated; seeds muricate.

2. *E. caespitosa*.

3. *E. elegans*.

4. *E. minutiflora*.

5. *E. Lemmonii*.

6. *E. glyptosperma*.

7. *E. Lobbii*.

1. *Eschscholzia californica* Cham. California Poppy. Fig. 1891.

Eschscholzia californica Cham. in Nees, Hor. Phys. Ber. 73. pl. 15. 1920.

Stems branching, decumbent or ascending from a thick branching taproot, leafy or scapose, 2–5 dm. high. Leaves ternately decomposed, the segments linear or oblong, glabrous and slightly glaucous, rarely sparingly puberulent; peduncles 5–15 cm. long; calyptra variable in size and shape, 1–4 cm. long; petals fan-shaped, 5 cm. long or less, orange varying to yellow; outer rim of receptacle spreading, 2–4 mm. wide; seeds reticulate; cotyledons 2-cleft.

The California Poppy exhibits wide variation in habit and floral characters. Some of these are ecological but others are inherent. In either case it is doubtful if they are of sufficient import to warrant taxonomic recognition. Almost as marked seasonal variation may occur in the same plant as is found in many of the segregates which have been proposed by Greene and Fedde, which total approximately 100.

The original collections of Chamisso and Eschscholtz were made at San Francisco and, as Chamisso's description and colored plate clearly show, were the glaucous yellow-flowered plants found along the coast.

Sand dunes and bluffs along the California coast from Mendocino County to the southern part of the state. Feb.–Sept.

The following species proposed by Greene, although showing considerable variation, are referable to this typical form: *cornuta*, *cucullata*, *glauca*, *maritima*, *Menziesiana*.

Eschscholzia californica var. *crœcea* (Benth.) Jepson, Fl. W. Mid. Calif. 207. 1901. Perennial from a stout taproot, the older plants often having a branched crown. Vernal specimens with large flowers; calyptra usually tapering to a long beak; petals deep orange or sometimes yellow, often 4–6 cm. long; outer rim of torus broad. Aestival plants with leafy often decumbent branches and paler foliage; flowers smaller; calyptra often abruptly short-beaked; petals yellow, 2–4 cm. long; outer rim of receptacle narrow. Grassy hillsides and valleys, usually in a loam soil, Transition and Upper Sonoran Zones; Columbia River, Washington, to northern Lower California. Extremely variable in foliage and flowers, and numerous segregates have been proposed. Along the coast it merges into the typical species, and often on high exposed rocky ridges simulates it.

Eschscholzia californica var. *peninsularis* (Greene) Munz, Man. S. Calif. 181. 1935. Annual with a rather slender, somewhat fleshy taproot, caespitose or with leafy branches; flowers much as in the preceding variety. Valleys and hillsides, usually in sandy soil; San Joaquin Valley to Lower California. Extremely variable, and possibly only an ecological phase of the preceding. Many segregates of these annual plants were proposed by Greene, the earliest being *E. peninsularis* Greene.

2. *Eschscholzia caespitosa* Benth. Tufted *Eschscholzia*. Fig. 1892.

Eschscholzia caespitosa Benth. Trans. Hort. Soc. Lond. II. 1: 408. 1835.

Eschscholzia tenuifolia Benth. loc. cit.

Eschscholzia rhombipetala Greene, Bull. Calif. Acad. 1: 71. 1885.

Stems usually scapose, branching at the base from a tuft of leaves, 1–2 dm. high. Leaves dissected into numerous narrow divisions, glabrous and somewhat glaucous or sparingly hispidulous; torus narrowly turbinate, without a spreading outer rim; calyptra ovoid-elliptic, apiculate; petals yellow, 1–2 cm. long; seeds reticulate or almost smooth, longer than broad, abruptly acute.

Foothills and valleys, Upper Sonoran Zone; Inner Coast Ranges and Sierra Nevada foothills of northern and central California. Type locality: first collected by Douglas, somewhere in the California Coast Ranges. April–May.

Eschscholzia caespitosa var. *hypocoides* (Benth.) Gray, Proc. Amer. Acad. 22: 272. 1887. Stems leafy, 1–4 dm. high, slender and more or less branched; torus turbinate without outer rim; seeds faintly reticulate. Foothills of the Sierra Nevada and Coast Ranges from northern to southern California.

3. *Eschscholzia elegans* Greene. Island *Eschscholzia*. Fig. 1893.

Eschscholzia elegans Greene, Bull. Calif. Acad. 1: 182. 1885.

Eschscholzia ramosa Greene, Bull. Torrey Club 13: 217. 1886.

Eschscholzia Wrigleyana Millsp. & Nutt. Field Mus. Bot. Ser. 5: 109. pl. 1. 1923.

Annual with stout leafy stems, branching above the base, 2–4 dm. high, glabrous. Leaves ample, very finely dissected, glaucous and glabrous or sparingly scabrous; torus broadly turbinate, without the spreading outer rim; calyptra ovoid, rounded or obtuse at the apex with a very short apiculation; petals yellow, often with orange base, 1–2 cm. long; seeds reticulate.

Open fields and borders of chaparral, Upper Sonoran Zone; Channel Islands from Santa Rosa to San Clemente, California; also Guadalupe Island, Lower California. Type locality: Guadalupe Island. March–June.

4. *Eschscholzia minutiflora* S. Wats. Pygmy Poppy. Fig. 1894.

Eschscholzia minutiflora S. Wats. Proc. Amer. Acad. 11: 122. 1876.

Eschscholzia modesta Greene, Pittonia 1: 169. 1888.

Annual, glabrous or rarely sparsely puberulent, somewhat glaucous, the stems leafy, branching, 1–3 dm. high. Leaves rather finely to coarsely dissected, the divisions linear to oblong; flowers scattered along the leafy stem; torus short-turbinate, without spreading outer rim; petals yellow, 3–6 mm. long; seeds globose, reticulate.

Dry desert slopes and plains, Upper and Lower Sonoran Zones; Washoe County, Nevada, and Inyo County, California. Several segregates were proposed by Greene and Fedde. Type locality: "From Northwestern Nevada to Arizona and Southern Utah." March–May.

Eschscholzia minutiflora var. *darwinensis* M. E. Jones, Contr. West. Bot. No. 8: 2. 1898. (*Eschscholzia Parishii* Greene, Bull. Calif. Acad. 1: 183. 1885.) Closely resembling the typical species, but the petals 8–15 mm. long. Panamint Mountains south to the Colorado Desert, California.

5. *Eschscholzia Lemmonii* Greene. Lemmon's Eschscholzia. Fig. 1895.

Eschscholzia Lemmonii Greene, W. Amer. Sci. 3: 157. 1887.

Eschscholzia urceolata Eastw. Bull. Torrey Club 30: 488. 1903.

Eschscholzia delitescens Fedde, Pflanzenreich 4¹⁰⁴: 300. 1909.

Annual, more or less canescent with short, usually curved hairs, the stems leafy, branching and decumbent or ascending, 15–30 cm. long. Leaves finely dissected, pubescent; torus urceolate; calyptra usually densely white-pubescent; petals orange or yellow, 15–25 mm. long; capsule 3–6 cm. long; seeds reticulate.

Dry interior hills and plains, Upper Sonoran Zone; Inner Coast Ranges of California, from San Benito County to San Luis Obispo County, also in the foothills of the Sierra Nevada. Type locality: Cholame, San Luis Obispo County, California. April–June.

6. *Eschscholzia glyptosperma* Greene. Mojave Poppy. Fig. 1896.

Eschscholzia glyptosperma Greene, Bull. Calif. Acad. 1: 70. 1885.

Eschscholzia paupercula Greene, Pittonia 5: 262. 1905.

Annual with many slender scapose stems arising from a dense tuft of nearly basal leaves, 1–2 dm. high. Leaves finely dissected into short crowded linear divisions, glaucous and glabrous; torus turbinate without a spreading outer rim; calyptra ovoid-lanceolate; petals yellow, 1–2 cm. long; seeds globose, rather remotely pitted and without reticulations.

Dry hillsides, Lower Sonoran Zone; Mojave Desert, California, east to southern Utah. Type locality: Mojave Desert, California. April–May.

7. *Eschscholzia Lobbii* Greene. Rough-seeded Eschscholzia. Fig. 1897.

Eschscholzia Lobbii Greene, Pittonia 5: 290. 1905.

Eschscholzia pulchella Greene, Pittonia 5: 291. 1905.

Eschscholzia graminea Fedde, Rep. Nov. Spec. 2: 146. 1906.

Annual with many slender erect scapose stems, 1–3 cm. high. Leaves basal or nearly so, forming a tuft, dissected into comparatively few narrowly linear elongated divisions; torus short-turbinate; calyptra ovoid, acute; petals yellow, 8–15 mm. long; seeds strongly muriculate.

Open hillsides and plains, Upper Sonoran Zone; Sacramento Valley and the surrounding Inner Coast Ranges and Sierra Nevada foothills, California. Type locality: northwestern Solano County, California. March–May.

Hunnemannia fumariaefolia Sweet, Brit. Flow. Gard. 3: 54. pl. 276. 1828. The Mexican Tulip Poppy, a native of Mexico, is occasionally found growing spontaneously in California.

6. *GLAUCIUM* Mill. Gard. Dict. Abr. ed. 4. 1754.

Glaucous annual or biennial plants, with alternate, clasping leaves, saffron-colored sap, and showy yellow flowers. Sepals 2. Petals 4. Stamens many. Stigma nearly sessile, 2-lobed, the lobes dilated, convex. Capsule long-linear, 2-celled, dehiscent to the base. Seeds cancellate, crestless. [Name Greek, in reference to the glaucous foliage.]

A genus of about 6 species, natives of the Old World, mainly of the Mediterranean region. Type species, *Chelidonium glaucium* L.

1. *Glaucium flavum* Crantz. Yellow-horned or Sea Poppy. Fig. 1898.

Chelidonium glaucium L. Sp. Pl. 506. 1753.

Glaucium flavum Crantz, Stirp. Aust. 2: 131. 1763.

Glaucium luteum Scop. Fl. Carn. ed. 2. 1: 369. 1772.

Glaucium glaucium Karst. Deutsch. Fl. 649. 1880–83.

Stems stout, rigid, branching, 5–10 dm. high. Leaves ovate or oblong in outline, 5–15 cm. long, scurfy, pinnatifid, the divisions toothed, or the uppermost merely lobed; flowers axillary and terminal; petals broadly obovate, 2–3 cm. long; capsule 15–20 cm. long.

In waste places, sparingly introduced in the Pacific States. Native of Europe. June–Sept.

7. *Stylomècon* G. Taylor, Journ. Bot. Brit. & For. 68: 140. 1930.

Annual with simple or branching stems, yellow juice, and pinnately parted or divided leaves. Flowers on slender axillary peduncles. Sepals 2, caducous. Petals 4. Stamens



1889



1890



1891



1892



1893



1894



1895



1896



1897

1889. *Dendromecon rigida*

1890. *Dendromecon Harfordii*

1891. *Eschscholzia californica*

1892. *Eschscholzia caespitosa*

1893. *Eschscholzia elegans*

1894. *Eschscholzia minutiflora*

1895. *Eschscholzia Lemmonii*

1896. *Eschscholzia glyptosperma*

1897. *Eschscholzia Lobbii*

numerous. Ovary turbinate, glabrous, with 4–11 parietal placentae; style slender, simple; stigma capitate. Capsule turbinate, tipped by the persistent style and dehiscent by 4–11 short valves at the summit. Seeds numerous, reniform, reticulate-rugose. [Name Greek, meaning style and poppy.]

A monotypic Californian genus. Resembling *Papaver californicum* in habit but style and fruit very unlike any member of that genus.

1. *Stylomecon heterophylla* (Benth.) G. Taylor. Wind Poppy. Fig. 1899.

Meconopsis heterophylla Benth. Trans. Hort. Soc. Lond. II. 1: 408. 1835.

Meconopsis crassifolia Benth. loc. cit.

Papaver heterophyllum Greene, Man. Bay Reg. 9. 1894.

Papaver heterophyllum var. *crassifolium* Jepson, Fl. W. Mid. Calif. 209. 1901.

Stylomecon heterophylla G. Taylor, Journ. Bot. 68: 140. 1930.

Annual, the stems simple or branching, 3–6 cm. high, glabrous or sparsely pilose-pubescent below. Leaves pinnately parted or divided, usually petioled and somewhat succulent; peduncles slender; petals 1–2 cm. long, brick red, with a purple spot above the green claw; capsule turbinate to obovate, dehiscent by 8 operculate lips.

Shaded slopes, Upper Sonoran Zone; Lake and Fresno counties, California, south to northern Lower California. Type locality: California Coast Ranges, collected by Douglas. April–May.

8. PAPAVER [Tourn.] L. Sp. Pl. 506. 1753.

Annual or perennial herbs with the sap narcotic, and milky or rarely turning yellow. Leaves pinnately lobed or dissected. Flowers showy, solitary on long peduncles, with 2 sepals, 4 petals, and numerous stamens. Ovary capped by the closely sessile, circular, flat or somewhat conical disk or combined radiate stigmas. Capsule dehiscent under the edge of the stigmas by as many dentiform short lids; placentae 4–20, mostly projecting far into the cell. [Classical name of the poppy.]

A genus of about 45 species, all natives of the Old World except the following. Type species, *Papaver somniferum* L.

1. *Papaver californicum* A. Gray. Western Poppy. Fig. 1900.

Papaver californicum A. Gray, Proc. Amer. Acad. 22: 313. 1887.

Papaver Lemmonii Greene, Pittonia 1: 168. 1888.

Erect, glabrous or sparsely pilose annual with milky sap, the stems simple or branching, 3–6 dm. high, leafy below. Leaves pinnately divided, the segments toothed or lobed; petals brick red with a greenish spot at base, 2 cm. long or less; capsule 10–15 mm. long, clavate-turbinate, 6–11-nerved.

Open woods, especially after fires, Upper Sonoran Zone; California Coast Ranges from Marin County to San Diego; rare and local north of Santa Barbara. Type locality: Santa Ynez Mountains, Santa Barbara County. April–May.

Papaver somniferum L. (Garden Poppy), *Papaver Rhoeas* L. (Red or Corn Poppy), and *P. Argemone* L. (Pale Rough-fruited Poppy) are occasionally found growing spontaneously in the Pacific States. They are all natives of the Old World.

9. ARGEMONE L. Sp. Pl. 508. 1753.

Annual or biennial herbs or one Mexican species shrubby, with yellow or white acrid sap. Leaves alternate, pinnatifid or sinuate, the divisions spinose-tipped. Flowers erect in bud. Sepals 2 or 3 with a cornute tip or appendage below the apex. Petals 4 or 6, showy. Stamens numerous. Stigmas sessile, somewhat radiate; ovary with 4–6 nerviform placentae. Capsule oblong, opening at the apex by 4–6 valves. Seeds numerous, globose, cancellate; endosperm oily. [Name Greek, meaning an eye disease, for which the juice of a plant so called was a supposed remedy.]

An American genus of about 10 species. Type species, *Argemone mexicana* L.

Leaves sinuate, rarely shallowly pinnatifid, sparsely spiny on the margins and beneath; seeds 1–1.5 mm. in diameter. 1. *A. corymbosa*.

Leaves irregularly pinnatifid, often nearly to the midrib, the divisions in turn often divided or toothed, sparsely to densely spiny and hispid on both surfaces; seeds 2–2.5 mm. in diameter. 2. *A. platyceras*.

1. *Argemone corymbosa* Greene. Leafy Prickly Poppy. Fig. 1901.

Argemone corymbosa Greene, Bull. Calif. Acad. 2: 59. 1886.

Argemone intermedia var. *corymbosa* Eastw. Erythra 4: 96. 1896.

Stems stout, erect, corymbosely branching, 4–10 dm. high, armed with stout yellow spines, otherwise glabrous. Leaves oblong to obovate or the upper ovate, 8–15 cm. long, repand-toothed or pinnatifid, rather sparingly prickly on both surfaces, especially on the veins, otherwise glabrous; sepals sparingly prickly, their horns unarmed on the outer surface; petals 20–35 mm. long; capsule about 2 cm. long, beset with spreading spines; deeply 8–12-grooved longitudinally.

Mojave Desert, Sonoran Zones; Inyo and San Bernardino Counties, California. Type locality: Mohave Desert. April–July.

2. *Argemone platyceras* Link & Otto. Chicalote or Broad-horned
Prickly Poppy. Fig. 1902.

Argemone platyceras Link & Otto, Ic. Pl. Rar. 1: 85. pl. 43. 1828.

Argemone munita Dur. & Hilg. Journ. Acad. Phila. 11. 3: 37. 1855.

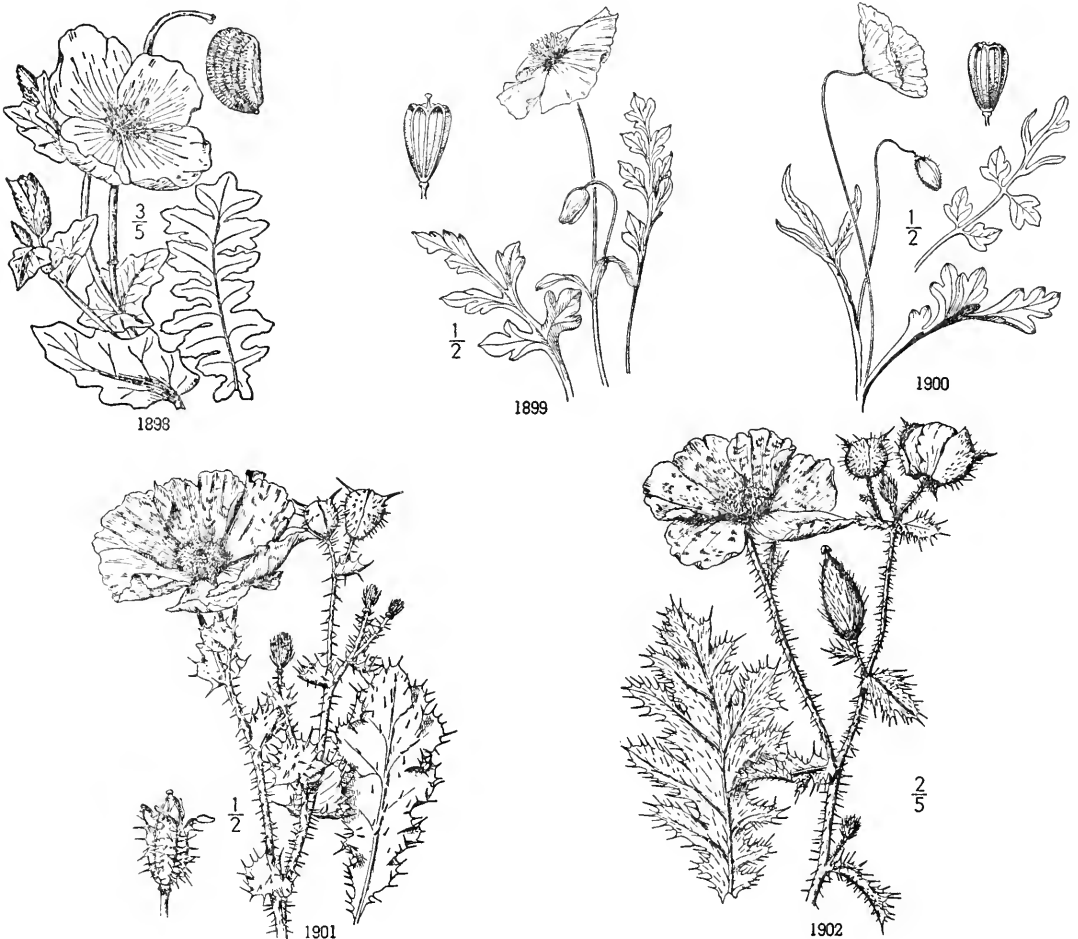
Stems stout, branched, 5-8 dm. high, more or less prickly with long yellow spines. Leaves oblong to oblong-obovate, 5-15 cm. long, sinuate-pinnatifid into spinose-toothed lobes, spinose, especially along the veins, otherwise glabrous and glaucescent; inflorescence paniculate, leafy; sepals more or less densely spiny with mostly ascending spines, their horns prominent, strongly spine-tipped and spinose, especially on the outer surface; petals 6, obovate, truncate, 25-40 mm. long, white; capsule cylindric, 2-5 cm. long, becoming indurate, densely spiny.

Dry washes and sandy plains, Sonoran Zones; lower Sacramento Valley, California, to northern Lower California, and east to Texas and northern Mexico. Type locality: Hacienda de la Laguna Confre Perote, Mexico. June-Aug.

Argemone platyceras var. *hispida* (A. Gray) Prain. Journ. Bot. 33: 1895. (*Argemone hispida* A. Gray, Mem. Amer. Acad. II. 4: 5. 1849.) Stems and leaves densely setose-hispid between the prominent spines. Dry washes, Lake County and the San Joaquin Valley to southern California, east to New Mexico.

10. *ARCTOMÈCON* Torr. & Frem. in Frem. Second Rep. 312. pl. 2. 1845.

Perennial herbs with somewhat woody taproots, the stems several from the caespitose base, subscapose. Leaves mostly basal, toothed at the apex and densely long-hirsute, those of the stem few or none, when present alternate and often entire. Flowers large, showy, white or yellow, peduncled. Sepals 2, glabrous or pubescent. Petals 4 or 6, tardily deciduous. Stamens numerous with slender filaments. Pistil with 3-6 carpels; style short; stigmas 3-6, short and thick; ovary 1-celled, with nerve-like parietal placenta; capsule obovoid to subcylindric, dehiscent from above, the 3-6 valves separating from the per-



1898. *Glaucium flavum*

1899. *Stylomecon heterophyllum*

1900. *Papaver californicum*

1901. *Argemone corymbosa*

1902. *Argemone platyceras*

sistent placentae. Seeds comparatively few, oblong, shining and finely lined longitudinally. [Name Greek, meaning bear and poppy, from the densely hairy leaves.]

A genus of three species, natives of the Great Basin region of western United States. Type species, *Arctomecon californica* Torr. & Frem.

1. *Arctomecon Merriamii* Coville. Desert Poppy, Merriam's Bear Poppy. Fig. 1903.

Arctomecon Merriamii Coville, Proc. Biol. Soc. Wash. 7: 66. 1892.

Stems sparsely branched near the base, about 3 dm. high, glaucous. Leaves mostly basal, 6–15 mm. long, cuneate-oblancoelate, flabelliform, narrowed to a winged petiole, coarsely toothed at the apex, truncate, covered with long brown hairs; flowers solitary on the elongated naked peduncles; sepals 3, villous-pubescent; petals usually 6, white, obcordate, 30–35 mm. long; capsule linear-oblong, 3–4 cm. long.

Desert slopes, Lower Sonoran Zone; eastern edge of California in Inyo County, east to adjacent southern Nevada. Type locality: a few miles west of Vegas Ranch, Lincoln County, Nevada. April–May.

Arctomecon californica Torr. & Frem. in Frem. Second Rep. 312. pl. 2. 1845. Characterized by its more numerous flowers on bracted peduncles, yellow petals and glabrous sepals. It inhabits southern Nevada, has not been found in California. The name was applied when the region belonged to Mexico, and the California of that time covered a much larger territory than the present state.

11. *CÂNBYA* Parry ex A. Gray, Proc. Amer. Acad. 12: 51. pl. 1. 1876.

Diminutive glabrous annuals, with very shortly branched stems. Leaves crowded in a dense basal tuft, alternate, linear and entire. Flowers solitary on very slender axillary peduncles. Sepals 3. Petals 6, deciduous or marcescent. Stamens 6–9. Pistil 3-carpellate; stigmas 3, radiate, adherent to the ovary; ovary 1-celled with 3 nerve-like parietal placentae. Capsule oblong-ovoid, the three valves dehiscing from the placentae; seeds several. [Name in honor of William H. Canby, an American botanist.]

A genus of two species, natives of western United States. Type species, *Canbya candida* Parry.

Petals white, persistent and closing over the ovary after anthesis.
Petals yellow, early deciduous.

1. *C. candida*.
2. *C. aurea*.

1. *Canbya candida* Parry. White Canbya. Fig. 1904.

Canbya candida Parry ex A. Gray, Proc. Amer. Acad. 12: 51. pl. 1. 1876.

Stems short, branched, forming tufts 1–3 cm. high. Leaves fleshy, narrowly linear, 5–10 mm. long; peduncles filiform, about 1–2 cm. long; petals pearly white, rounded, 3–4 mm. long, closing over the ovary after anthesis; capsule oblong-ovoid, 2 mm. long.

Sandy washes, Sonoran Zones; Mojave Desert, southern California. Type locality: toward the head of Mojave Desert. April–June.

2. *Canbya aurea* S. Wats. Yellow Canbya. Fig. 1905.

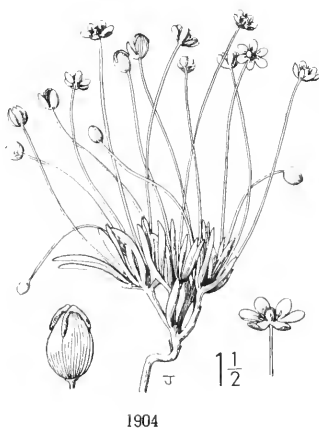
Canbya aurea S. Wats. Proc. Amer. Acad. 21: 445. 1886.

Stems short-branched, forming rounded tufts 1–2 cm. high. Leaves fleshy, narrowly linear, 3–8 mm. long, glabrous or sparingly pubescent; peduncles very slender, 2–5 cm. long; petals bright yellow, broadly ovate, 3 mm. long, deciduous; capsule oblong-ovoid, 2.5 mm. long.

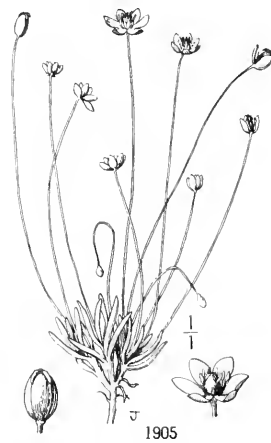
Sagebrush plains, Upper Sonoran Zone; eastern Oregon from Crook County to Lake County, east to Malheur County and probably adjacent Idaho. Type locality: sagebrush plains southwest of Prineville, Oregon. April–July.



1903



1904



1905

Family 51. **FUMARIACEAE.**

FUMEWORT FAMILY.

Herbaceous plants with watery juice and alternate or basal, dissected leaves and no stipules. Flowers perfect, hypogynous, irregular. Sepals 2, small and bract-like. Petals 4, somewhat united into two dissimilar pairs, the 2 outer ones spreading at the apex and one or both saccate or spurred at base, the two inner smaller and narrower, their tips thickened and united over the stigma. Stamens 6, diadelphous, in two sets of 3 each. Pistil of 2 carpels; stigma 2-lobed; ovary 1-celled, ovules one to several, anatropous or amphitropous. Fruit a 2-valved several-seeded capsule or an indehiscent 1-seeded nut. Seeds with a minute embryo imbedded in fleshy endosperm.

Five genera and about 170 species, natives of the north temperate zone and southern Africa.

Outer petals similar, both spurred or merely saccate at the base.

1. *Dicentra*.

Outer petals dissimilar, one spurred at the base, the other not.

2. *Corydalis*.

Fruit an elongated 2-valved capsule; ovules and seeds several.

3. *Fumaria*.

Fruit an indehiscent 1-seeded nut.

1. **DICÉNTRA** Bernh. *Linnaea* 8: 468. 1833.

Perennial herbs, with dissected basal or cauline leaves. Flowers perfect, usually flattened and heart-shaped, irregular, racemose or paniculate, or sometimes solitary. The two outer petals saccate at the base, spreading at the apex, the inner narrow, clawed, usually cohering above and crested on the back. Stamens 6, in two bundles opposite the outer petals. Ovary with 2 parietal placentae; style slender. Fruit an elongated 2-valved capsule. Seeds several. [Name Greek, meaning twice-spurred.]

A genus of about 16 species, natives of North America and Asia. Type species, *Dicentra Cucullaria* (L.) Bernh. *Bicuculla* Adans. (1763) and *Diclytra* Borkh. (1797) have priority, but the name *Dicentra* is conserved.

Stems leafy; flowers erect; seeds papillate.

Flowers golden yellow, 12–15 mm. long, not crowded.

1. *D. chrysantha*.

Flowers ochroleucous, 20–25 mm. long, in one or few dense clusters.

2. *D. ochroleuca*.

Stems scapose, about as long as the basal leaves; flowers drooping; seeds black, finely reticulate.

Plants with creeping rootstocks and fibrous roots.

Outer petals rose-purple, deeply cordate at base; leaves glaucous beneath, green above.

3. *D. formosa*.

Outer petals ochroleucous, shallowly cordate at base; leaves glaucous on both surfaces.

4. *D. oregona*.

Plants with a fascicle of fusiform roots or a short tuber-bearing rootstock.

Petals cordate at base; roots fusiform.

Flower solitary; outer petals recurved or widely spreading from near the base.

5. *D. uniflora*.

Flowers 1–3; outer petals spreading only at the tip.

6. *D. pauciflora*.

Petals spurred at base; rootstock short, tuber-bearing.

7. *D. Cucullaria*.

1. **Dicentra chrysántha** (Hook. & Arn.) Walp. Golden *Dicentra* or Ear-drops. Fig. 1906.

Diclytra chrysantha Hook. & Arn. Bot. Beechey 320. pl. 73. 1840.

Dicentra chrysantha Walp. Rep. 1: 118. 1842.

Capnorchis chrysantha Planch. Fl. Serres 8: 193. pl. 820. 1853.

Diclytra chrysantha Greene, Pittonia 1: 187. 1888.

Bicuculla chrysantha Coville, Contr. U.S. Nat. Herb. 4: 60. 1893.

Plants very pallid and glaucous, the stems rigidly erect, 6–15 dm. high, arising from a stout root. Leaves sparsely scattered along the stem, bipinnate, with rather stiff petioles and rachis, 15–30 cm. long, the ultimate pinnae divided into acutish lobes; flowers erect, in an elongated narrow panicle, golden yellow, ill-smelling; sepals suborbicular, 4 mm. long, caducous; corolla only slightly cordate at base, 12–15 mm. long; outer sepals saccate below, spreading from about the middle; crest of the inner petals rather narrow and crisped; capsule ovoid-lanceolate, 15–20 mm. long, beaked by the elongated rigid style; seeds densely papillate.

Dry gravelly hillsides or arroyos, Arid Transition and Upper Sonoran Zones; Lake and Calaveras Counties, California, south to northern Lower California. Type locality: California Coast Ranges. May–Sept.

2. **Dicentra ochroleuca** Engelm. Yellow *Dicentra*. Fig. 1907.

Dicentra ochroleuca Engelm. Bot. Gaz. 6: 223. 1881.

Diclytra ochroleuca Greene, Pittonia 1: 187. 1888.

Capnorchis ochroleuca Greene, Fl. Fran. 279. 1891.

Bicuculla ochroleuca Heller, Cat. N. Amer. Pl. 4. 1898.

Rigidly erect very glaucous herb, closely resembling the preceding species in general vegetative characters. Flowers in densely crowded, few to several clusters; corolla 20–25 mm. long,

ochroleucous; outer petals with only the tips spreading; inner petals purple-tipped; seeds papillate.

Open woods and chaparral, Upper Sonoran Zone; Santa Ynez Mountains to Temescal, southern California. Type locality: Santa Monica Mountains. June–July.

3. *Dicentra formosa* (Andr.) Walp. Pacific Bleeding Heart. Fig. 1908.

Fumaria formosa Andr. Bot. Rep. 6: pl. 393. 1800.

Corydalis formosa Pursh, Fl. Amer. Sept. 2: 462. 1814.

Diclytra formosa DC. Syst. 2: 109. 1821.

Diclytra formosa G. Don, Gen. Hist. Pl. 1: 140. 1831.

Dicentra formosa Walp. Rep. 1: 118. 1842.

Capnorchis formosa Kuntze, Rev. Gen. Pl. 1: 15. 1891.

Bikukulla formosa Coville, Contr. U.S. Nat. Herb. 4: 60. 1893.

Plants scapose, arising from a rather stout creeping rootstock. Basal leaves long-petioled, ternately decompound, 3–5 dm. long, the ultimate segments oblong, 3–5 cm. long, glaucous beneath; scapes naked, or rarely with a much reduced leaf, usually exceeding the basal leaves; flowers in a several-flowered panicle; bracts narrow, acuminate; sepals lanceolate to ovate; corolla rose-purple, cordate with short rounded spurs, 15–18 mm. long; petals united to above the middle, the outer with ovate spreading tips, the inner wing-crested on the back; capsules about 2 cm. long; seeds shining, black, finely reticulate.

Moist woods and stream banks. Transition Zone; Vancouver and western British Columbia south through the Cascade Mountains and the Coast Ranges to central California. Type locality: Nootka Sound, Vancouver Island. April–July.

Dicentra formosa var. *breviflora* Henderson, Rhodora 33: 204. 1931. A form with smaller flowers; corolla 10 mm. wide and 12 mm. long. Based on specimens collected at Mirror Lake, south of Mount Hood, Oregon.

4. *Dicentra oregona* Eastw. Oregon *Dicentra*. Fig. 1909.

Dicentra oregona Eastw. Proc. Calif. Acad. IV. 20: 144. 1931.

Similar to the preceding species but smaller, mostly 2–3 dm. high and the foliage pallid and glaucous. Flowers ochroleucous, ovate-cordate, 15 mm. long; tips of the outer petals yellow, spreading, those of the inner rose-colored; capsule about 12 mm. long; seeds black, shining, finely reticulate, with a lateral lobed translucent caruncle.

Dry gravelly slopes, Arid Transition Zone; Siskiyou Mountains of Josephine County, Oregon, and Del Norte County, California. Type locality: Telephone Point, near the state line, on the Waldo–Crescent City Road, Josephine County, Oregon. April–June.

Dicentra nevadensis Eastw. Proc. Calif. Acad. IV. 20: 143. 1931. Closely resembling *D. oregona*, and probably not specifically distinct; the herbage pallid and glaucous. Ultimate divisions of the leaves with linear, acute lobes about 1 mm. wide; scapes 1–2 dm. high, surpassing the leaves; flowers shallowly cordate at base, about 12 mm. long; outer petals ochroleucous, with the tips spreading, yellow; inner petals with the tips white tinged with pale yellow. Open coniferous forests, Canadian Zone; southern Sierra Nevada, California. Type locality: Alta Peak Trail, Sequoia National Park, California.

5. *Dicentra uniflora* Kell. Steer's Head. Fig. 1910.

Dicentra uniflora Kell. Proc. Calif. Acad. 4: 141. 1871.

Diclytra uniflora Greene, Pittonia 1: 187. 1888.

Capnorchis uniflora Kuntze, Rev. Gen. Pl. 1: 15. 1891.

Bikukulla uniflora Howell, Fl. N.W. Amer. 34. 1897.

Plants scapose, arising from a fascicle of fusiform tubers. Leaves basal, bi- or tri-ternate, 4–6 cm. long, the ultimate segments oblong or somewhat spatulate, glaucous beneath; scapes slightly exceeding the leaves, 1-flowered; bracts 1 or 2 at the apex of the scape proper; sepals oblong- to ovate-lanceolate; corolla white or flesh-colored, 15 mm. long, cordate at base; outer petals narrowed and strongly recurved nearly to the broader cordate base; inner petals with a sagittate blade, purple-tipped, not crested; style very slender, not becoming rigid and only the base persistent; capsule ovoid, about 12 mm. long; seeds semiorbicular, black and shining, finely and obscurely reticulate, with a rib-like crest on the back.

Gravelly soils, Boreal Zones; Cascade Mountains, Washington, and northern Idaho, south to the Sierra Nevada, California, and east to Wyoming and Utah. Type locality: Cisco and Summit, Placer County, California. May–July.

6. *Dicentra pauciflora* S. Wats. Few-flowered Bleeding Heart. Fig. 1911.

Dicentra pauciflora S. Wats. Bot. Calif. 2: 429. 1880.

Diclytra pauciflorum Greene, Pittonia 1: 187. 1888.

Capnorchis pauciflora Greene, Fl. Fran. 279. 1891.

Bikukulla pauciflora Coville, Contr. U.S. Nat. Herb. 4: 60. 1893.

Plants scapose, arising from a fascicle of fusiform tubers. Leaves basal, solitary or few, 4–6 cm. long, ternately decompound, the ultimate divisions narrowly linear and acute, pale green, glaucous beneath; scapes slender, slightly exceeding the leaves, 1–3-flowered; sepals ovate-lanceolate; corolla 18–20 mm. long, white or flesh-colored, deeply cordate at base with a narrow sinus, the reflexed tip much shorter than the body of the outer petals; blade of the inner petals ligulate, about equaling the dilated claw, abruptly expanded into a spatulate purple apex.

Volcanic soils, Boreal Zones, mainly Hudsonian; locally distributed in the North Coast Ranges and in the southern Sierra Nevada, California. Type locality: Scott Mountains and Castle Lake, Trinity Mountains, California. June–July.

7. *Dicentra Cucullaria* (L.) Bernh. Dutchman's Breeches. Fig. 1912.

Fumaria Cucullaria L. Sp. Pl. 699. 1753.

Diclytra Cucullaria D.C. Syst. 2: 108. 1821.

Dielytra Cucullaria G. Don, Gen. Hist. Pl. 1: 140. 1831.

Dicentra Cucullaria Bernh. Linnaea 8: 457, 468. 1833.

Bicuculla Cucullaria Millsp. Bull. W. Va. Agr. Exp. Sta. 2: 327. 1892.

Bicuculla occidentalis Rydb. Bull. Torrey Club 29: 160. 1902.

Scapose perennial from a short rootstock, bearing bulbous tubers. Leaves basal, with elongated slender petioles, ternately compound, the ultimate segments linear or oblong; scapes slightly exceeding the leaves, 12–25 cm. high; flowers several in a terminal secund raceme, nodding on short slender pedicels; corolla 12–18 mm. long, white or tinged with pink, yellow at tip; outer petals produced at base into a prominent divergent spur, spreading at apex; inner petals with a prominent crest; seeds black and shining, very obscurely reticulate, crested.

Moist woods or shaded hillsides, Upper Sonoran and Transition Zones; eastern Washington and Oregon to Nova Scotia, Missouri, and North Carolina. Type locality: Virginia. April–May.

2. *CORYDALIS* Vent. Choix 19. 1803.

Erect or climbing herbs, with decomposed leaves. Flowers racemose, terminal or opposite the leaves. Sepals 2, small. Corolla irregular, deciduous; petals 4, erect and connivent, one of the outer pair spurred at the base, the inner pair narrow, keeled dorsally. Stamens 6, opposite the outer petals. Capsule 2-valved, linear or oblong; placentae 2; style persistent. Seeds with an aril-like crest. [Name Greek, from the ancient name of the crested lark.]

About 110 species, native of the north temperate zone and South Africa. Type species, *Corydalis sempervirens* (L.) Pers.

Spur much exceeding the petals in length; flowers rose or cream-white; capsule oblong or oblong-ovoid, elastically dehiscent.

Hood of spurred petal without a membranous spreading or reflexed margin; flowers rose-colored.

1. *C. Scouleri*.

Hood of spurred petal with a thin spreading or reflexed margin; flowers cream-colored or white.

Margin of hood on spurred petal narrow, spreading.

2. *C. Caseana*.

Margin of hood on spurred petal broad, reflexed and covering the crest.

3. *C. Cusickii*.

Spur scarcely half the length of the petals; flowers yellow; pod linear, torulose.

4. *C. aurea*.

1. *Corydalis Scouleri* Hook. Scouler's *Corydalis*. Fig. 1913.

Corydalis Scouleri Hook. Fl. Bor. Amer. 1: 36. 1829.

Corydalis macrophylla Nutt. in Torr. & Gray, Fl. N. Amer. 1: 69. 1838.

Capnodes Scouleri Kuntze, Rev. Gen. Pl. 1: 15. 1891.

Corydalis Allenii Fedde, Rep. Spec. Nov. 10: 478. 1912.

Stems stout, 10 dm. or less in height, arising from tuberous roots. Leaves thrice ternate, or the third division pinnate; leaflets oblong to oblong-elliptic, 2–3 cm. long, obtuse or rounded at apex, sometimes apiculate; raceme narrow, the flowers not crowded, rose-colored; spur rather stout, ascending, straight, 12–15 mm. long, its hood with a prominent dorsal crest; capsule ovoid-oblong, 9–10 mm. long.

Stream banks and moist woods, Canadian and Humid Transition Zones; Olympic Peninsula, Washington, to Tillamook, Oregon, mostly near the coast. Type locality: "In dark shady woods of North-West America; plentiful near the confluence of the Columbia with the sea." May–July.

2. *Corydalis Caseana* A. Gray. Sierra *Corydalis*. Fig. 1914.

Corydalis Caseana A. Gray, Proc. Amer. Acad. 10: 69. 1874.

Corydalis Bidwellii S. Wats. Bot. Calif. 2: 479. 1880.

Capnodes Caseanum Kuntze, Rev. Gen. Pl. 1: 14. 1891.

Stems stout, rather succulent, 5–10 dm. high, arising from thickened roots. Leaves 15–35 cm. long; leaflets elliptic-lanceolate to ovate, apiculate, 10–25 mm. long; racemes many-flowered, 5–12 cm. long; flowers white with the tips of the petals purple; spur rather slender, 12–15 mm. long, its hood concave, with a narrow spreading membranous margin; capsule oblong, 12–14 mm. long, 5 mm. thick; seeds shiny black, with a conspicuous caruncle.

Stream banks, Transition Zone; Sierra Nevada from Shasta County to Plumas County, California. Type locality: Big Meadows, Plumas County, California. June–Aug.

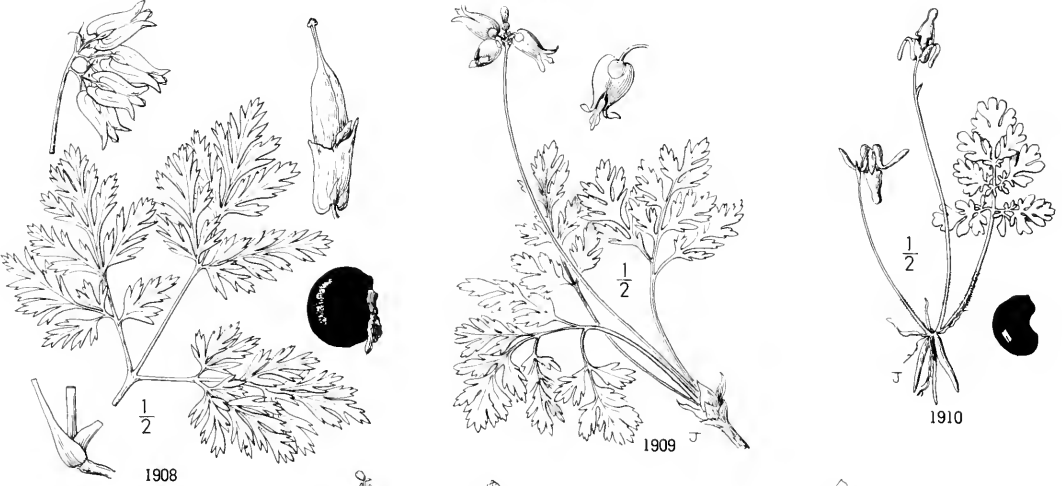
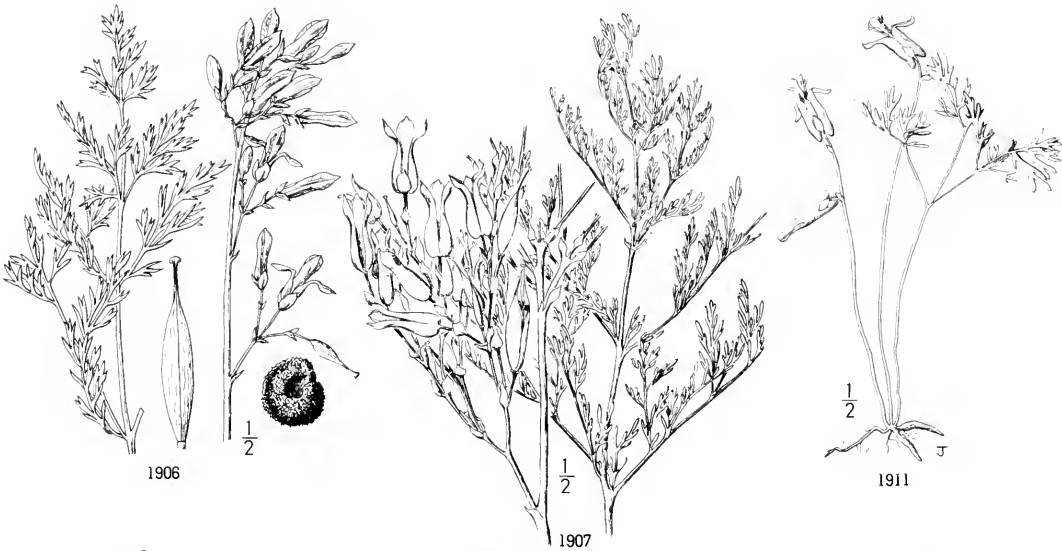
3. *Corydalis Cusickii* S. Wats. Cusick's *Corydalis*. Fig. 1915.

Corydalis Cusickii S. Wats. Bot. Calif. 2: 430. 1880.

Capnoides Cusickii Heller, Cat. N. Amer. Pl. 4. 1898.

Stems stout, fleshy, 5–10 dm. high, arising from thickened perennial roots. Leaves 25–60 cm. long, the leaflets oblong-lanceolate to broadly ovate, mucronulate, 1–2 cm. long; racemes densely flowered, 10–30 cm. long; flowers cream-white, sometimes suffused with rose-purple; spur stout, straight or curved slightly upward, 15–18 mm. long, its hood with a prominent crest covered by the broad reflexed margins; capsule oblong, 12–15 mm. long; seeds shiny black with a prominent caruncle.

Stream banks, Arid Transition and Canadian Zones; Blue and Powder Mountains, Oregon, east to adjacent Idaho. Type locality; Union County, Oregon. June–Aug.



1906. *Dicentra chrysantha*
1907. *Dicentra ochroleuca*
1908. *Dicentra formosa*

1909. *Dicentra oregona*
1910. *Dicentra uniflora*
1911. *Dicentra pauciflora*

1912. *Dicentra Cucullaria*
1913. *Corydalis Scouleri*
1914. *Corydalis Caseana*

4. *Corydalis aurea* Willd. Golden Corydalis. Fig. 1916.

Corydalis aurea Willd. Enum. Hort. Ber. 740. 1809.

Capnodes aureum Kuntze, Rev. Gen. Pl. 1: 14. 1891.

Corydalis oregana Fedde, Rep. Spec. Nov. 11: 290. 1912.

Corydalis washingtoniana Fedde, op. cit. 10: 419. 1912.

Winter annual or possibly biennial, diffusely branching and leafy from the base, 1-4 dm. high. Leaves bipinnate, the leaflets pinnatifid; racemes short, mostly few-flowered; flowers golden yellow, 12-15 mm. long; spur about half as long as the petals, curved downward; capsules linear, 2-3 cm. long, about 2 mm. thick, more or less pendulous and curved, torulose.

Dry or moist soils, Arid Transition and Upper Sonoran Zones; British Columbia, eastern Washington, eastern Oregon, and northeastern California to New England and Texas. Type locality: "In Canada." May-Aug.

3. *FUMARIA* [Tourn.] L. Sp. Pl. 699. 1753.

Annual glaucous herbs, with diffusely branching, erect or scandent stems. Leaves decompose with small narrow segments. Racemes terminal or opposite the leaf. Sepals 2, scale-like. Petals 4, erect-connivent, the outer dissimilar, one of them spurred, the inner pair narrow, coherent at apex, carinate or crested on the back. Stamens 6, diadelphous, opposite the outer petals. Style filiform, with a small, entire or obscurely 2-lobed stigma; ovary with 1 ovule near the base. Fruit subglobose, indehiscent, 1-seeded. [Name Latin, meaning smoke, in allusion to the smoke-like smell of some species.]

About 15 species, all natives of the Old World. Type species, *Fumaria officinalis* L.

1. *Fumaria officinalis* L. Fumitory. Fig. 1917.

Fumaria officinalis L. Sp. Pl. 700. 1753.

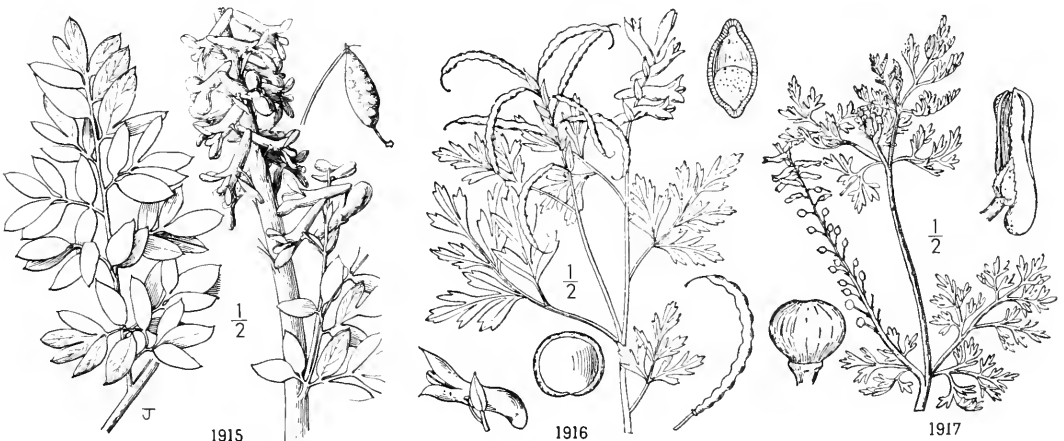
Glabrous and glaucous, the stems diffusely branched, spreading or ascending, 2-8 dm. long. Leaves petioled, finely dissected into narrow, linear or cuneate segments; racemes narrow, 2.5-7.5 cm. long; bracts small; pedicels 2-4 mm. long; flowers purple, darker at the apex, 4-6 mm. long; nutlet depressed-globose, 2 mm. in diameter.

Waste places, Willamette Valley, Oregon, and central California. Adventive from Europe. April-June.

Fumaria parviflora Lam. Encycl. 2: 567. 1786. Segments of the leaflets narrowly linear, acute, channeled; flowers 3-4 mm. long, cream-colored except the purple tips of the inner petals; nutlet apiculate. Edges of gardens and waste places, Santa Clara Valley, California. Adventive from Europe. April-May.

Family 52. **BRASSICACEAE.** MUSTARD FAMILY.

Herbs or rarely suffrutescent plants, with acrid juice, alternate leaves and racemose or corymbose flowers. Sepals 4, deciduous or persistent, the 2 outer narrow, the inner similar, or concave or saccate at base. Petals 4, rarely 2 or none, hypogynous, cruciate, nearly equal, usually clawed. Stamens 6, rarely 2 or 4, hypogynous, tetradynamous. Pistil 1, compound, consisting of 2 united carpels, the parietal placentae united by dissepiment; style generally persistent, sometimes none; stigma discoid or more or less 2-lobed. Fruit a silique or silicle, 2-celled or



1915. *Corydalis Cusickii*

1916. *Corydalis aurea*

1917. *Fumaria officinalis*

rarely 1-celled, 2-valved or rarely indehiscent. Endosperm none; cotyledons incumbent, accumbent or conduplicate.

A family of about 200 genera and 1800 species, of wide geographical distribution. Also called the *Cruciferae*.

Pubescence when present of simple, unbranched hairs, except in some genera of the *Sisymbriinae*.

Stigma lobes situated over the valves; anthers sagittate at base; pods linear, elongated, sessile or stipitate. (Tribe *Thelypodieae*.)

Pods long-stipitate; stamens well exerted, beyond the petals.

I. STANLEYINAE.

Pods sessile or subsessile.

II. THELYPODIINAE.

Stigma lobes situated over the placentae; anthers not sagittate at base; pods of various shapes. (Tribe *Sinapceae*.)

Pods of various forms, seldom over twice as long as wide (silicles).

Silicles globose or oblong, scarcely or not at all compressed. See also genus no. 9, *Hymenophysa*.

Leaves subulate; aquatic plants.

III. SUBULARIINAE.

Leaves not subulate.

V. COCHLEARIINAE.

Silicles strongly compressed at right angles to the narrow partition, except in *Hymenophysa*.

Pods dehiscent.

IV. LEPIDIINAE.

Pods indehiscent.

VIII. ISATIDINAE.

Pods linear, except *Idahoa*, over 3 times as long as wide, or if shorter prominently beaked (silique).

Siliques conspicuously beaked.

Pods transversely 2-jointed, the upper joint at length deciduous. VII. CAKILINAE.

Pods not transversely 2-jointed.

Pods 2-celled by a thin longitudinal partition; dehiscent by valves.

IX. BRASSICINAE.

Pods indehiscent, 1-celled, the spaces between the seeds filled with spongy tissue.

X. RAPHANINAE.

Siliques merely tipped by the short style or sessile stigma.

Pods terete or 4-angled, not flattened parallel with the partition; cotyledons incumbent.

VI. SISYMBRIINAE.

Pods flattened parallel with the partition; cotyledons accumbent.

XI. CARDAMININAE.

Pubescence when present of stellate or forked hairs. See also *Sisymbriinae*.

Stigma lobes situated over the valves. (Tribe *Schizopetalae*.)

Flowers in the axils of the leaves on the upper part of the stem.

XII. SCHIZOPETALINAE.

Flowers in terminal leafless racemes.

XIII. PHYSARIINAE.

Stigma lobes situated over the placentae. (Tribe *Hesperideae*.)

Pods not linear, seldom over twice as long as wide.

Pods flattened contrary to the partition or turgid.

XIV. CAPSELLINAE.

Pods flattened parallel to the partition.

XVII. ALYSSINAE.

Pods narrowly linear, over three times as long as wide.

Epidermal cells of the partition wall not reticulate.

Petals with lateral and one median nectary.

XV. TURRITINAE.

Petals with lateral and two median nectaries.

XVI. ERYSIMINAE.

Epidermal cells of the partition wall reticulate.

Flowers purple; plants stellate-pubescent, in our species.

XVIII. HESPERIDINAE.

Flowers yellow; plants glabrous, in our species.

XIX. MORICANDINAE.

I. STANLEYINAE.

Sepals reflexed or spreading in anthesis; anthers spirally coiled.

1. *Stanleya*.

Sepals erect or ascending in anthesis; anthers strongly recurved but not spirally coiled.

2. *Chlorocrambe*.

II. THELYPODIINAE.

Calyx not urn-shaped.

Pods terete or 4-sided; seeds not winged.

Anthers curved or twisted.

3. *Thelypodium*.

Anthers neither curved nor twisted.

4. *Schoenocrambe*.

Pods flattened parallel with the partition; seeds usually winged.

Anthers curved and twisted; petals narrow, usually crisped.

5. *Streptanthus*.

Anthers neither curved nor twisted; petals not crisped.

6. *Streptanthella*.

Calyx urn-shaped, the sepals curved inward.

7. *Caulanthus*.

III. SUBULARIINAE.

Represented by the single genus.

8. *Subularia*.

IV. LEPIDIINAE.

Pods inflated, tardily dehiscent.

9. *Hymenophysa*.

Pods strongly compressed.

Pods smooth and glabrous or pubescent.

10. *Lepidium*.

Pods rugose-reticulate or tuberculate.

11. *Coronopus*.

V. COCHLEARIINAE.

Pods strongly flattened contrary to the partition, crested and winged.

12. *Thlaspi*.

Pods subglobose, only slightly compressed contrary to the partition, not winged.

13. *Cochlearia*.

VI. SISYMBRIINAE.

Pubescence of simple hairs.

14. *Sisymbrium*.

Pubescence of forked hairs.

Pods terete.

Leaves entire or toothed; styles nearly as broad as ovary.

15. *Arabidopsis*.

Leaves finely pinnate; styles much narrower than ovary.

16. *Halimolobos*.

Pods 4-sided; leaves lobed or pinnatifid.

17. *Descurainia*.

VII. CAKILINAE.

Pods 2-jointed, the upper joint at length deciduous; seeds 1 in a joint.

18. *Cakile*.

VIII. ISATIDINAE.

Introduced weed; leaves clasping.

19. *Isatis*.

IX. BRASSICINAE.

Beak of the pod more or less strongly flattened.

Valves 1-nerved, the nerve prominent.

20. *Eruca*.

Valves 3-nerved; beak often containing a seed.

21. *Sinapis*.

Beak of the pod conical, not flattened, seedless.

Pods terete; seeds in 1 row in each cell.

22. *Brassica*.

Pods somewhat flattened; seeds in 2 rows in each cell.

23. *Diplataris*.

X. RAPHANINAE.

Pods indehiscent, 1-celled, the spaces between the seeds filled with spongy tissue.

24. *Raphanus*.

XI. CARDAMININAE.

Pods linear, more or less turgid.

Valves 1-nerved; flowers yellow except in two species of *Rorippa*.

Seeds in 1 row in each cell; pods somewhat 4-sided.

25. *Barbarea*.

Seeds in 2 rows in each cell; pods terete.

26. *Rorippa*.

Valves nerveless; flowers white, often showy.

Stems leafy, not arising from tuberous roots.

27. *Cardamine*.

Stems arising from tuberous roots, bearing 2 or 3 leaves below the inflorescence; basal leaf often remote from the stem on an elongated subterranean petiole.

28. *Dentaria*.

Pods suborbicular, strongly flattened parallel with the partition; stems scapose, 1-flowered.

29. *Idahoia*.

XII. SCHIZOPETALINAE.

Racemes leafy; pods broadly linear, compressed contrary to the partition.

30. *Tropidocarpum*.

XIII. PHYSARIINAE.

Pods emarginate at apex or more or less didymous.

Pods merely emarginate at apex, lyre-shaped.

31. *Lyrocarpa*.

Pods more or less didymous.

Pods strongly didymous and flattened; seeds solitary in each cell.

32. *Dithyrea*.

Pods didymous but more or less inflated; seeds 2 or more in each cell.

33. *Physaria*.

Pods rounded to acute at apex; seeds several in each cell.

Pods nearly as broad as long, generally inflated.

34. *Lesquerella*.

Pods lanceolate, several times longer than broad; strongly compressed parallel with the partition.

35. *Phoenicaulis*.

XIV. CAPSELLINAE.

Pods debiscent.

Flowers white; pods compressed.

Pods compressed contrary to the partition.

Pods elliptic; valves with a prominent midrib.

36. *Hutchinsia*.

Pods cuneate to triangular-obcordate.

37. *Capsella*.

Pods compressed parallel with the partition.

40. *Draba*.

Flowers yellow; pods turgid.

38. *Camelina*.

Pods indehiscent.

Flowers yellow; pods strongly reticulated, not winged.

39. *Neslia*.

Flowers white; pods not strongly reticulated.

Pods not winged.

Pods 1-seeded, not twisted.

41. *Athyasus*.

Pods several-seeded, twisted when mature.

42. *Heterodraba*.

Pods broadly winged, the wings often perforated.

43. *Thysanocarpus*.

XV. TURRITINAE.

Pods terete or nearly so.

Plants stellate-pubescent; leaves pinnate.

44. *Smelowskia*.

Plants glabrous or sparsely pubescent below with simple hairs; leaves entire or merely toothed.

45. *Turritis*.

Pods flattened parallel with the partition.

46. *Arabis*.

XVI. ERYSIMINAE.

Perennials with more or less showy yellow flowers; pubescence of 2-forked hairs.

47. *Erysimum*.

XVII. ALYSSINAE.

Flowers white; pubescence of 2-forked hairs.

48. *Koniga*.

Flowers yellow; pubescence of stellate hairs.

49. *Alyssum*.

XVIII. HESPERIDINAE.

Leaves serrate; stigma lobes small, flat.

50. *Hesperis*.

Leaves entire; stigma lobes larger, corniculate.

51. *Matthiola*.

XIX. MORICANDIINAE.

Leaves clasping; glabrous.

52. *Conringia*.

1. *STANLEYA* Nutt. Gen. 2: 71. 1818.

Mostly large, stout biennial or perennial herbs; similar in general appearance to *Cleome*, glabrous and glaucous or sparsely pubescent with unbranched hairs. Leaves entire and clasping, or petioled and entire, or variously pinnatifid. Inflorescence crowded, racemose even in anthesis; pedicels mostly horizontal. Flower buds distinctly clavate. Sepals erect, widely spreading or reflexed in anthesis. Petals yellow or yellowish, linear, oblanceolate, or with a broad blade and narrow claw. Stamens subequal in length; anthers becoming tightly coiled or twisted at maturity. Pod stipitate, terete and often more or less torulose, 3–8 cm. long; style short; stigma small, entire or nearly so. Seeds not winged; cotyledons accumbent. [Name in honor of Lord Edward Stanley, one-time President of the Linnaean Society, a noted English ornithologist.]

A genus of about 8 species, confined to the arid region of western United States. Type species, *Stanleya pinnata* (Pursh) Britton.

Middle stem leaves sessile, sagittate and auricled at the base; plants quite glabrous.

Biennial; sepals erect in anthesis; stem leaves not decurrent on the stem.

Perennial; sepals reflexed in anthesis; stem leaves somewhat decurrent.

Middle stem leaves petioled at the base; plants glabrous or hairy.

Claws of the petals glabrous; filaments woolly at base; leaves usually entire.

Claws of the petals as well as the filaments hairy; leaves usually pinnatifid.

1. *S. confertiflora*.

2. *S. viridiflora*.

3. *S. elata*.

4. *S. pinnata*.

1. *Stanleya confertiflora* (Robinson) Howell. Biennial Prince's Plume. Fig. 1918.

Stanleya viridiflora var. *confertiflora* Robinson in A. Gray, Syn. Fl. N. Amer. 1: 178. 1895.

Stanleya confertiflora Howell, Fl. N.W. Amer. 1: 59. 1897.

Stanleya rara A. Nels. Bot. Gaz. 52: 262. 1911.

Stanleya annua M. E. Jones, Contr. West. Bot. No. 17: 25. 1930.

Biennial from a stout taproot, the stem usually solitary, stout, erect, unbranched, 3–9 dm. high. Leaves narrowly sagittate, acute, 4–9 cm. long, erect or ascending; sepals light green or yellowish, linear, erect or spreading in age; petals yellow, glabrous, linear, crisped, 2.5–3 cm. long; stamens glabrous, distinctly tetradynamous; anthers 1.5 mm. long; pods slender, scarcely torulose, 4–6 cm. long; stipe slender, about 2 cm. long.

Dry clay or alkaline soil in the juniper belt of the Upper Sonoran Zone; eastern and southeastern Oregon to adjacent Idaho. Type locality: "Base of Stein's Mountain, Oregon." April–July.

2. *Stanleya viridiflora* Nutt. Green Prince's Plume. Fig. 1919.

Stanleya viridiflora Nutt. in Torr. & Gray, Fl. N. Amer. 1: 98. 1838.

Stanleya collina M. E. Jones, Zoe 3: 284. 1893.

Perennial from a stout taproot, the stems stout, erect, simple or sparingly branched, 2–8 dm. high. Basal leaves tufted, narrowed to a winged petiole, entire or with a few salient lobes or teeth near the base of the blade; stem leaves sessile, more or less sagittate and amplexicaul at the base; inflorescence elongated; pedicels horizontal, rather reflexed in anthesis; petals about 2 cm. long, yellowish green; pod torulose, arcuate-recurved, 5–7 cm. long; stipe 10–20 mm. long.

Dry hills, Upper Sonoran Zone; southeastern Oregon to southwestern Montana, Wyoming, northern Utah, and northeastern Nevada. Type locality: "Bare shelving hills on Ham's Fork of the Colorado of the West," southwestern Wyoming. March–Aug.

3. *Stanleya elata* M. E. Jones. Tall Prince's Plume, Panamint Plume. Fig. 1920.

Stanleya elata M. E. Jones, Zoe 2: 16. 1891.

Biennial or short-lived perennial, the stem 6–18 dm. high, stout, simple or sparingly branched upwards. Lower leaves very thick and leathery, entire or with a few small lobes near the base, oval in outline, obtuse, petioled; upper leaves reduced, narrow, acute; pedicels horizontal, 10–12 mm. long; sepals golden yellow, conspicuous, 10–13 mm. long, spreading or reflexed in age; petals light yellow, usually slightly shorter than the sepals, glabrous, linear-oblanceolate; stamens twice as long as the petals; anthers loosely coiled at maturity; filaments woolly toward the base; pod slender, 7–10 cm. long; stipe 12–16 mm. long.

Dry plains and hills in the upper part of the Lower Sonoran Zone; Inyo County, California, to southern Nevada and northwestern Arizona. Type locality: near Hawthorne, Nevada. March–Sept.

4. *Stanleya pinnata* (Pursh) Britt. Golden Prince's Plume, Desert Plume. Fig. 1921.

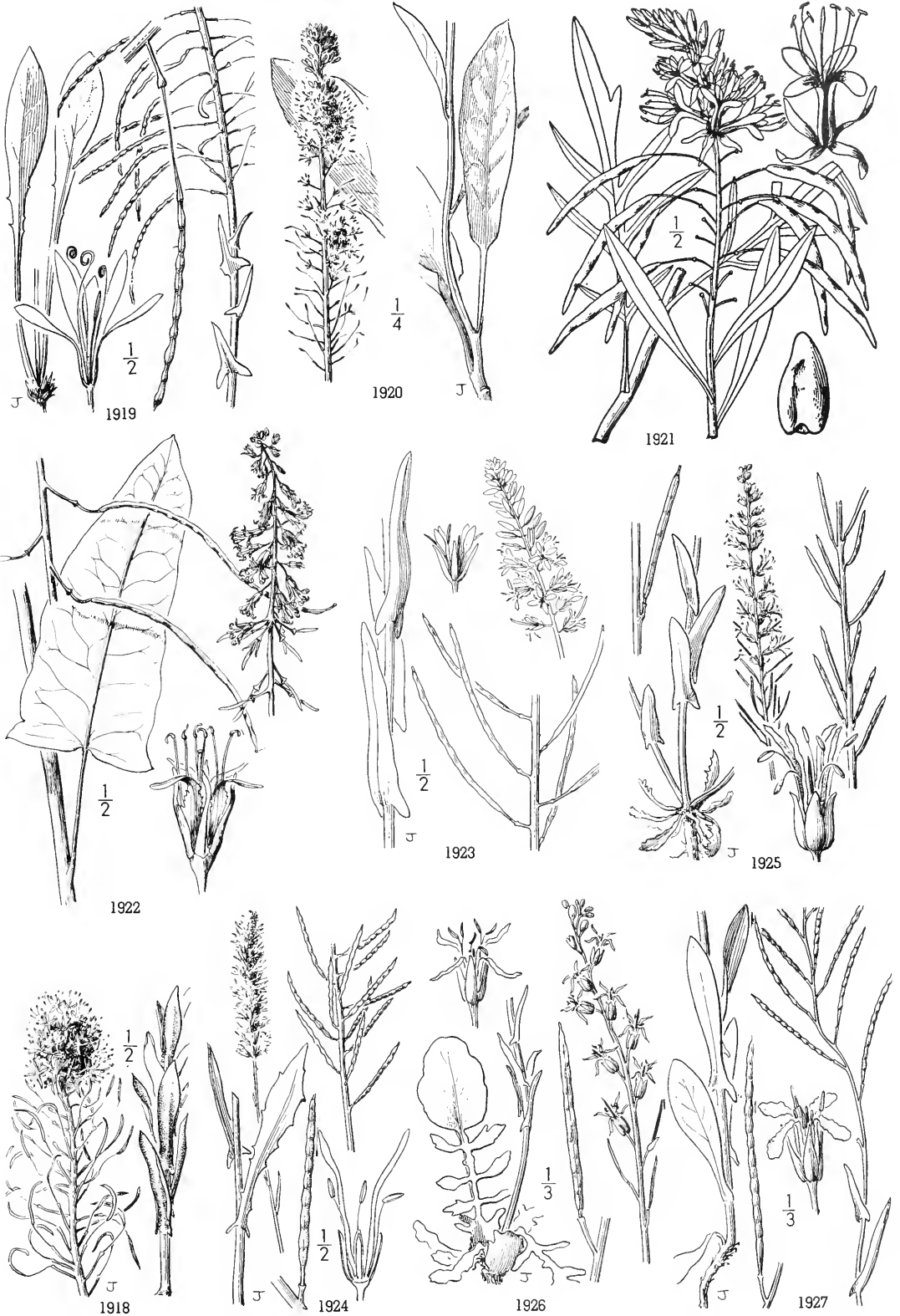
Cleome pinnata Pursh, Fl. Amer. Sept. 2: 739. 1816.

Stanleya pinnatifida Nutt. Gen. 2: 71. 1818.

Stanleya heterophylla Nutt. in Torr. & Gray, Fl. N. Amer. 1: 97. 1838.

Stanleya pinnata Britt. Trans. N.Y. Acad. 8: 62. 1889.

Perennial from a stout, woody root, glaucous and glabrous, sparsely pilose or densely puberulent, the stems erect, simple or sparingly branched, often flexuous, 4–16 dm. high. Leaves exceedingly variable in outline and size (5–20 cm. long), usually more or less pinnate or pinnatifid, often lyrate and sometimes entire, petioled, commonly narrower and more nearly



1918. *Stanleya confertiflora*
 1919. *Stanleya viridiflora*
 1920. *Stanleya elata*

1921. *Stanleya pinnata*
 1922. *Chlorocrambe hastata*
 1923. *Thelypodium eucosmum*
 1924. *Thelypodium brachycarpum*

1925. *Thelypodium crispum*
 1926. *Thelypodium Howellii*
 1927. *Thelypodium sagittatum*

entire upwards; inflorescence 3-6 dm. long; pedicels horizontal or ascending, commonly less than 1 cm. long; sepals reflexed in anthesis; petals golden yellow, 12-16 mm. long, usually with a broad blade and narrower woolly claw; stamens subequal; anthers coiled at maturity; pods often torulose, 3-7 cm. long, ascending or arcuate-recurved; stipe 1-3 cm. long.

Dry flats and hills, Upper Sonoran Zone; Idaho and Nevada to southern California, Utah, Colorado, Wyoming, and the plains of South Dakota, Nebraska, and Kansas. Type locality: "In upper Louisiana." April-Sept.

2. *CHLOROCRÁMBE* Rydb. Bull. Torrey Club 34: 435. 1907.

Perennial herb with rather stout, erect stem and thin, petioled, more or less hastate leaves. Flowers greenish yellow, in loose, virgate racemes. Sepals similar, spreading. Petals dentate or laciniately toothed laterally. Pods widely spreading, subterete, shortly stipitate; stigma entire; cells of the septum elongated parallel to the replum, not tortuous. Seeds neither winged nor margined; cotyledons obliquely accumbent. [From the Greek *chloros*, green, and *crambe*, a Greek name for a genus of this family.]

A monotypic genus of western North America.

1. *Chlorocrambe hastata* (S. Wats.) Rydb. *Chlorocrambe*. Fig. 1922.

Caulanthus hastatus S. Wats. Bot. King Expl. 28. 1871.

Chlorocrambe hastata Rydb. Bull. Torrey Club 34: 435. 1907.

Glabrous throughout, the stem simple or sparingly branched, 6-15 dm. high. Leaves ample, except the uppermost, broadly deltoid, hastate or lanceolate, entire or coarsely and irregularly lobed, 5-10 cm. long, base truncate or sometimes subcordate; petioles of lower leaves frequently appendaged with several entire or lobed segments of the blade; uppermost leaves much reduced, narrowly lanceolate, entire; sepals greenish, narrowly lanceolate, about 6 mm. long, slightly spreading, distant; petals whitish, somewhat exceeding the sepals, irregularly dentate or sub-lacinate laterally toward the base; filaments distinctly longer than the petals; pods widely spreading, subterete, slightly flattened parallel to the septum, 4-7 cm. long; stipe 1-7 mm. long; style very short; stigma capitate, entire.

Transition Zone; northern Utah and the Wallowa Mountains, Oregon. Type locality: "On shaded slopes in the Wahsatch and Uinta Mountains," Utah. June-July.

3. *THELYPÓDIUM* Endl. Gen. 876. 1839.

Biennial or perennial herbs, with mostly erect simple or branched stems, glabrous or pubescent with simple hairs. Stem leaves frequently sagittate at base. Inflorescence usually racemose, rarely corymbose. Flowers purple, lilac, rose-colored or white; petals linear, oblong or oblanceolate, entire. Pods terete or slightly flattened parallel to the partition, stipitate or sessile, horizontal to erect; style short; stigma small, entire or very slightly 2-lobed; septum with a mid-band due to the elongation of the cells in that region. Seeds not winged; cotyledons usually obliquely incumbent. [Name from the Greek, meaning female and foot, on account of the stipitate ovary of some species.]

A genus of about 12 species peculiar to western North America. Type species, *Thelypodium laciniatum* (Hook.) Endl.

Cauline leaves sagittate or amplexicaul.

Biennials or short-lived perennials.

Raceme dense, narrow, spike-like; pedicels rarely over 5 mm. long.

Fruiting pedicels divergent, 1-3 mm. long.

Petals red-purple; pedicels 2-3 mm. long.

Petals white; pedicels stout, 1 mm. long.

Fruiting pedicels slender, erect, 3-5 mm. long.

Raceme lax and narrow, or, if dense, corymbose and broader; pedicels usually more than 5 mm. long.

Petals spatulate or broader.

Inflorescence distinctly racemose; basal leaves lyrate-toothed.

Inflorescence corymbose or shortly racemose; basal leaves entire.

Petals filiform; inflorescence racemose.

Perennials; caudex clothed with the papery remains of old leaf-bases.

Cauline leaves not sagittate or amplexicaul.

Fruiting racemes dense, spike-like; biennials.

Stem leaves toothed or lobed.

Stem leaves entire.

Fruiting raceme open; annuals.

Petals 8-15 mm. long, yellow, crisped.

Petals 4-5 mm. long, flat.

Sepals purple, spreading.

Sepals green or yellowish, erect.

1. *T. eucosmum*.

2. *T. brachycarpum*.

3. *T. crispum*.

4. *T. Howellii*.

5. *T. sagittatum*.

6. *T. stenopetalum*.

7. *T. flexuosum*.

8. *T. laciniatum*.

9. *T. integrifolium*.

10. *T. flavescens*.

11. *T. Lemmonii*.

12. *T. lasiophyllum*.

1. *Thelypodium eucosmum* Robinson. Red-purple Thelypodium. Fig. 1923.

Thelypodium eucosmum Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 175. 1895.

Probably biennial, glabrous and more or less glaucous throughout. Basal leaves oblanceolate, subentire; stem leaves 2-6 cm. long, usually acute; sepals reddish purple, narrow, 6-7 mm. long,

not saccate; petals narrowly spatulate, 8–11 mm. long, red-purple; inflorescence racemose; pedicels nearly or quite horizontal, 3–5 mm. long; pods arcuate, ascending, terete, slightly torulose, 3–4.5 cm. long; stipe 2–3 mm. long; style less than 1 mm. long; stigma entire, small.

A rare species known only from the Arid Transition Zone in northeastern Oregon. Type locality: Baker City, Oregon. June.

2. *Thelypodium brachycarpum* Torr. Short-podded *Thelypodium*. Fig. 1924.

Thelypodium brachycarpum Torr. Bot. Wilkes Exp. 231. pl. 1. 1874.

Thelypodiopsis brachycarpa O. E. Schulz, Bot. Jahrb. 66: 98. 1933.

Biennial, glabrous or sparsely pilose towards the base, the stems 3–15 dm. high, simple or virgately branched, rather stout. Basal leaves oblanceolate or spatulate, definitely toothed to deeply lyrate-pinnatifid, 4–6 cm. long; stem leaves 1–5 cm. long, narrow, acute, entire or toothed, basal lobes acute; sepals and petals white or pale yellow, the former linear-lanceolate, acute, the latter linear, 2–3 times as long as the sepals; stamens exserted, the filaments nearly equal; inflorescence dense, racemose; pedicels stout, 1–2 mm. long, divergent; pods unequally torulose, ascending, 15–30 mm. long; stipe 1–1.5 mm. long; style about 0.5 mm. long, stigma truncate, small.

Transition Zone; northern California and southern Oregon. Type locality: "On the Klamet [Klamath] River, southern borders of Oregon." June–Aug.

3. *Thelypodium crispum* Greene. Crisped *Thelypodium*. Fig. 1925.

Thelypodium crispum Greene ex Payson, Ann. Mo. Bot. Gard. 9: 264. 1923.

Thelypodiopsis crispa O. E. Schulz, Bot. Jahrb. 66: 98. 1933.

Very similar in appearance to *T. brachycarpum*; sepals white or sometimes roseate or purplish; pedicels slender, 3–5 mm. long, erect; pods unequally torulose, 1.5–3 cm. long; stipe about 1 mm. long.

Transition Zone; eastern California from Lassen County to northern Inyo County, and in adjacent western Nevada. Type locality: Eagle Valley, Ormsby County, Nevada. June–July.

4. *Thelypodium Howellii* S. Wats. Howell's *Thelypodium*. Fig. 1926.

Thelypodium Howellii S. Wats. Proc. Amer. Acad. 21: 445. 1886.

Streptanthus Howellii M. E. Jones, Proc. Calif. Acad. II. 5: 623. 1895.

Thelypodium simplex Greene, Pittonia 4: 200. 1900.

Thelypodiopsis Howellii O. E. Schulz, Bot. Jahrb. 66: 98. 1933.

Biennial, more or less hispid-pubescent near the base, otherwise glabrous, somewhat glaucous, the stems slender, erect, simple or sparingly branched, 3–8 dm. high. Basal leaves oblanceolate, 2–4 cm. long, lyrate toothed; sepals purplish, scarious-margined, about 7 mm. long; petals pale blue or purple, spatulate, crisped, twice as long as the sepals; inflorescence racemose, lax; pedicels ascending, about 5 mm. long, stout; pods erect or ascending, 2–5 cm. long, about 1 mm. wide; stipe less than 0.5 mm. long; style about 1 mm. long.

Upper Sonoran and Transition Zones; eastern Oregon to northeastern California. Type locality: Camp Polk in Harney Valley, eastern Oregon. June–July.

5. *Thelypodium sagittatum* (Nutt.) Endl. Sagittate *Thelypodium*. Fig. 1927.

Streptanthus sagittatus Nutt. Journ. Acad. Phila. 7: 12. 1834.

Thelypodium sagittatum Endl. in Walp. Rep. 1: 172. 1842.

Thelypodium Nuttallii S. Wats. Bot. King Expl. 26. 1871.

Thelypodium torulosum Heller, Bull. Torrey Club 25: 265. 1898.

Thelypodiopsis sagittata O. E. Schulz, Bot. Jahrb. 66: 99. 1933.

Biennial or short-lived perennial, glaucous, glabrous or sparsely hirsute near the base, the stems usually branched from the base as well as upwards, 3–7 dm. high. Basal leaves entire, oblanceolate, 4–12 cm. long; stem leaves acute or obtuse; sepals purplish with scarious margins, 5–7 mm. long; petals white to deep purple, 2–3 times as long as the sepals, blade oblanceolate, gradually narrowed to the slender subequal claw; inflorescence corymbose, elongating and racemose when mature; pedicels divergent-ascending, 5–12 mm. long; pods 2–6 cm. long; stipe nearly or quite obsolete; style 1–1.5 mm. long.

Upper Sonoran and Transition Zones; central Washington to western Montana, Wyoming, northern Colorado, Utah, and northern Nevada. Type locality: Little Lost River, Idaho. May–Aug.

6. *Thelypodium stenopetalum* S. Wats. Slender-petalled *Thelypodium*.

Fig. 1928.

Thelypodium stenopetalum S. Wats. Proc. Amer. Acad. 22: 468. 1887.

Thelypodiopsis stenopetala O. E. Schulz, Bot. Jahrb. 66: 99. 1933.

Probably biennial, glabrous and glaucous throughout, the stem branched from the base, simple or sparingly branched above, slender, 3–6 dm. high. Basal leaves soon withering, oblanceolate, entire or repand; sepals purplish or green, linear, about 1 cm. long; petals narrowly linear, somewhat crisped, white or roseate, at least one-half longer than the sepals; anthers coiled when dry; inflorescence elongated, lax, racemose even before anthesis; pedicels ascending, 4–6 mm. long; pods slender, ascending, 4–5.5 cm. long; stipe obsolete; style not more than 1 mm. long; stigma very slightly 2-lobed.

Transition Zone; Bear Valley, San Bernardino Mountains, California. Type locality: Upper Lake, Bear Valley, California. June.

7. *Thelypodium flexuosum* Robinson. Perennial Thelypodium. Fig. 1929.

Thelypodium flexuosum Robinson in A. Gray, Syn. Fl. N. Amer. 1: 175. 1895.

Perennial, glabrous throughout, the caudex clothed with the papery remains of old leaf bases, the stems 3–5 dm. long, slender, sparingly branched, subdecumbent, frequently flexuous, nearly naked above. Basal leaves 8–15 cm. long, numerous, entire, lanceolate, gradually narrowed to the slender petiole; stem leaves distant, lance-linear, acuminate, auriculate at the base with linear, acute lobes; petals pale purplish or white, spatulate, about twice as long as the sepals; anthers 1–2 mm. long; inflorescence lax, at first corymbose, at maturity racemose; pedicels slender, divergent-ascending, 5–8 mm. long; pods conspicuously reticulate, irregularly torulose, 15–22 mm. long; stipe nearly or quite obsolete; style slender, about 1 mm. long.

Alkaline flats and meadows, Upper Sonoran Zone; eastern Oregon to northwestern Nevada and north-eastern California. Type locality: near Carson City, Nevada. May–June.

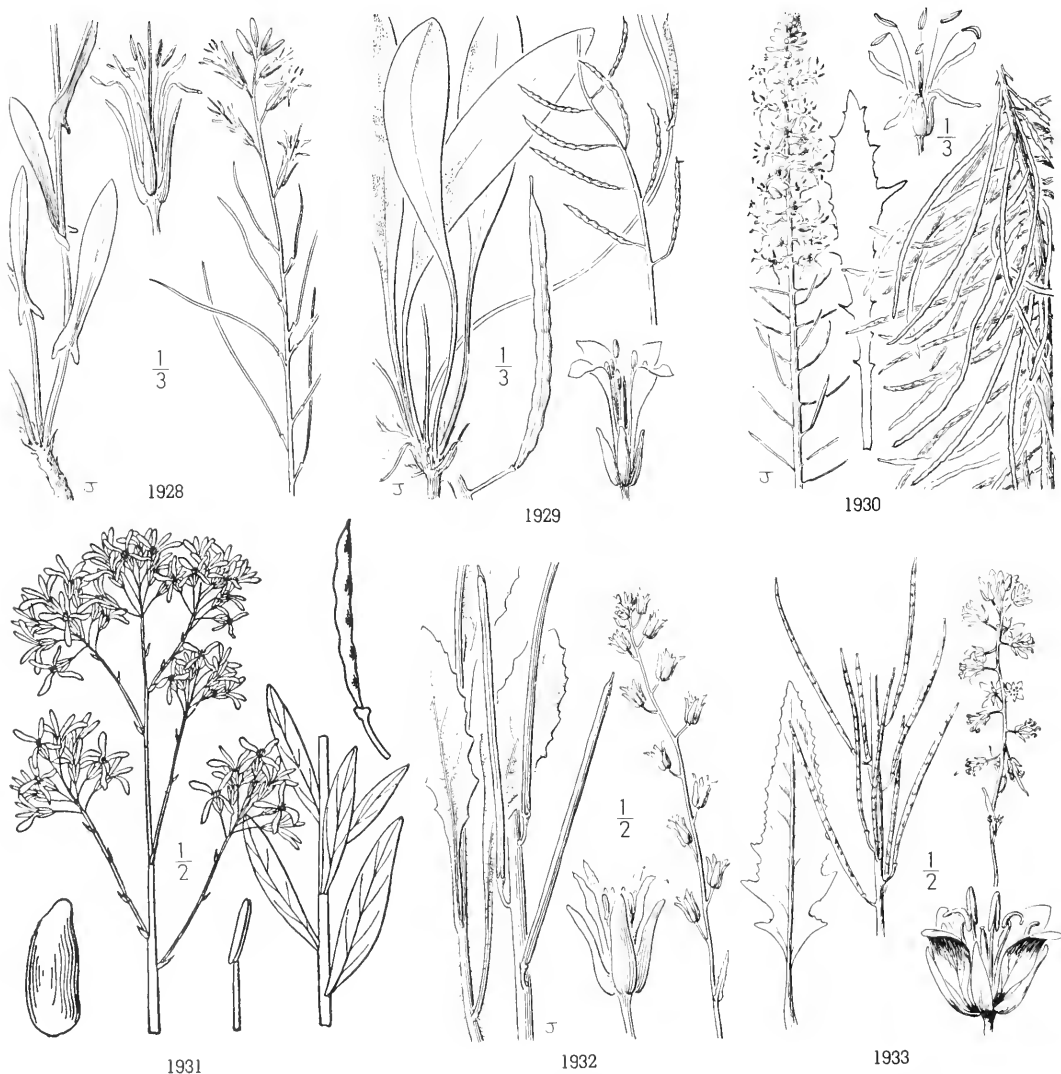
8. *Thelypodium laciniatum* (Hook.) Endl. Cut-leaved Thelypodium. Fig. 1930.

Macropodium laciniatum Hook. Bot. Misc. 1: 341. pl. 68. 1830.

Thelypodium laciniatum Endl. in Walp. Rep. 1: 172. 1842.

Thelypodium streptanthoides Leiberg, Contr. U.S. Nat. Herb. 11: 299. 1906.

Biennial, glabrous and more or less glaucous, the stems usually stout, irregularly branching upwards, 3–24 dm. high. Basal leaves petioled, thick, deltoid-lanceolate, 1–5 dm. long, irregularly and deeply lobed; stem leaves petioled, deeply pinnatifid to subentire; sepals 4–7 mm. long, white or purplish; petals nearly linear, 7–21 mm. long, about 1 mm. broad, white; inflorescence race-



1928. *Thelypodium stenopetalum*
1929. *Thelypodium flexuosum*

1930. *Thelypodium laciniatum*
1931. *Thelypodium integrifolium*

1932. *Thelypodium flavescens*
1933. *Thelypodium Lemmonii*

mose even in anthesis, dense, 1–6 cm. long; pedicels stout, 3–5 mm. long, horizontal or ascending; pods somewhat flattened parallel to the septum, erect, widely spreading or recurved, 3–10 cm. long, about 1 mm. wide; stipe 2–4 mm. long.

Upper Sonoran Zone; southern British Columbia, western and southern Idaho, eastern Washington and Oregon, western Nevada, northern and southeastern California (Inyo County). Type locality: near Walla Walla and at Priest's Rapid, Columbia River. April–June. This is a polymorphic species, and a number of segregates have been proposed.

9. *Thelypodium integrifolium* (Nutt.) Endl. Entire-leaved *Thelypodium*. Fig. 1931.

Pachypodium integrifolium Nutt. in Torr. & Gray, Fl. N. Amer. 1: 96. 1838.

Thelypodium integrifolium Endl. in Walp. Rep. 1: 172. 1842.

Thelypodium lilacinum Greene, Pl. Baker. 3: 9. 1901.

Thelypodium rhomboideum Greene, Pittonia 4: 314. 1901.

Thelypodium affine Greene, Pittonia 4: 314. 1901.

Biennial, glabrous throughout, the stems erect, branching, 6–15 dm. high. Basal leaves oblong-elliptical, 1–3 dm. long, gradually narrowed to a broad petiole; stem leaves linear-lanceolate, narrowed to the base, reduced upwards and becoming linear in the inflorescence; petals spatulate, about 8 mm. long, exceeding the sepals by one-half, bluish or pale rose-colored; inflorescence at first corymbose, when mature somewhat elongated but remaining dense; pedicels 5–8 mm. long, slender, usually somewhat wing-margined at the base, horizontal or slightly ascending; pods irregularly torulose, arcuate, ascending, 2–3 cm. long; stipe 1–2 mm. long.

Upper Sonoran Zone; Washington, Oregon, Nevada, and California to the Rocky Mountain region. Type locality: elevated plains of the Rocky Mountains toward the Oregon, as far as Walla Walla. June–Aug. This is a polymorphic species which has been segregated into smaller units. (See Payson, Ann. Mo. Bot. Gard. 9: 276–282. 1923.)

10. *Thelypodium flavescens* (Hook.) S. Wats. Yellow-flowered *Thelypodium*. Fig. 1932.

Streptanthus flavescens Hook. Ic. Pl. 1: pl. 44. 1837.

Streptanthus procerus Brewer, Proc. Amer. Acad. 6: 519. 1866.

Thelypodium flavescens S. Wats. Bot. King Expl. 25. 1871.

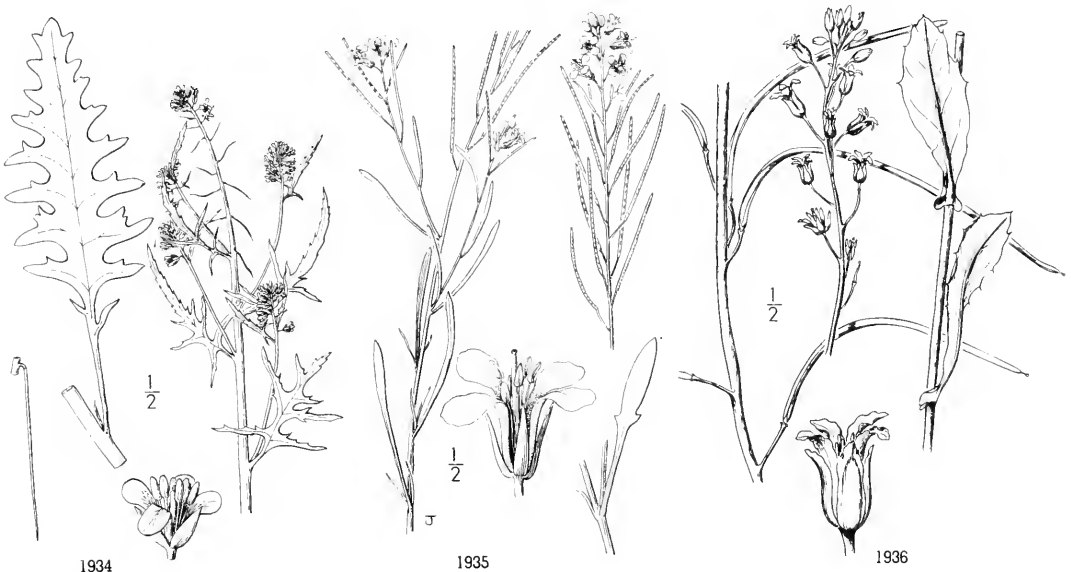
Thelypodium Hookeri Greene, Fl. Fran. 263. 1891.

Thelypodium Greenei Jepson, Fl. W. Mid. Calif. 212. 1901.

Guillenia flavescens Greene, Leaflets Bot. Obs. 1: 228. 1906.

Annual, rather stout, glabrous and glaucous or sparsely hirsute, the stems erect, simple or branching in the inflorescence, 3–12 dm. high. Basal leaves petioled, lanceolate to oblanceolate in outline, sinuate-pinnatifid, lyrate or coarsely lacinate, 5–22 cm. long; stem leaves sessile, shortly petioled or even slightly amplexicaul, deeply toothed to subentire; inflorescence rather lax, racemose; pedicels curved upwards, 5–7 mm. long; sepals pale yellow, lanceolate, acute or acuminate, 7–11 mm. long, glabrous; petals light yellow, 9–15 mm. long, claw rather broad, blade narrow, crisped, recurved; pods erect, terete or somewhat 4-angled, glabrous or sparsely hirsute, 4–8.5 cm. long; style tapering, 2–3.5 mm. long; stigma entire or slightly 2-lobed.

Upper Sonoran Zone; Inner Coast Ranges, west-central California. Type locality: "Monterey, California." March–June.



1934. *Thelypodium lasiophyllum*

1935. *Schoenocrambe linifolia*

1936. *Streptanthus campestris*

11. *Thelypodium Lemmonii* Greene. Lemmon's *Thelypodium*. Fig. 1933.

Thelypodium Lemmonii Greene, W. Amer. Sci. 3: 156. 1887.

Caulanthus anceps Payson, Ann. Mo. Bot. Gard. 9: 303. 1923.

Annual, glabrous and glaucous or sparsely pilose near the base, the stems erect, 6–18 dm. high. Basal and lower stem leaves narrowed to a short petiole, lanceolate, sinuate-dentate, often deeply lobed near the base, 6–15 cm. long; upper leaves reduced; inflorescence shortly racemose, lax; pedicels slender, at first horizontal, later reflexed or ascending, 5–6 mm. long; sepals spreading, purple, margins scarious, oblong, obtuse, 3–4 mm. long; petals pale, oblanceolate, 4–5 mm. long; pods erect or pendent, terete, glabrous or sparsely hirsute, 3–5 cm. long; style tapering, 2–3 mm. long.

Upper Sonoran Zone; Inner Coast Ranges, San Joaquin County to San Luis Obispo County, California. Type locality: Lemmon's Ranch in the mountains of San Luis Obispo County. March–April.

12. *Thelypodium lasiophyllum* (Hook. & Arn.) Greene. California Mustard. Fig. 1934.

Turritis lasiophylla Hook. & Arn. Bot. Beechey 321. 1841.

Sisymbrium reflexum Nutt. Proc. Acad. Phila. 4: 25. 1850.

Thelypodium lasiophyllum Greene, Bull. Torrey Club 13: 142. 1886.

Microsisymbrium lasiophyllum O. E. Schulz, Pflanzenreich 4¹⁰⁵: 162. 1924.

Annual, more or less hirsute with simple or forked hairs, rarely glabrous, the stems erect, 3–20 dm. high. Leaves petioled, the lower irregularly pinnatifid with divaricate, obtuse or acute segments, the upper reduced; inflorescence corymbose, rapidly elongating at maturity; pedicels 2–4 mm. long, at first ascending, in age usually becoming strongly recurved; sepals oblong, 3–4 mm. long; petals white or light yellow, narrowly spatulate, about 6 mm. long; pods reflexed, terete, 3–6 cm. long; style about 1 mm. long; stigma small, circular.

Upper and Lower Sonoran Zones; western Washington to northern Lower California. Type locality: "California," Jan.–June.

Thelypodium lasiophyllum var. *inaliënum* Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 177. 1895. (*Sisymbrium acuticarpum* M. E. Jones.) Differs from the typical form in having erect rather than reflexed pods. Occurs throughout the range of the typical species but is particularly abundant near San Francisco.

Thelypodium lasiophyllum var. *rigidum* (Greene) Robinson, loc. cit. Stout and very rigid, 3–10 dm. high, glabrous above; pods ascending, stout, on very short, stout pedicels. Mostly in north-central California and western Nevada.

Thelypodium lasiophyllum var. *utahëense* (Rydb.) Jepson, Man. Fl. Pl. Calif. 413. 1925. Glabrous or nearly so; leaves thin, lobes usually rounded and obtuse; pods reflexed, usually curved outward. Interior desert region from Utah and Nevada to southern California.

4. *SCHOENOCRÁMBE* Greene, Pittonia 3: 124. 1896.

Glabrous or inconspicuously pubescent perennials, with creeping rootstocks, the stems and branches slender, broom-like. Leaves rather few, narrow, entire or pinnatifid, sessile or petioled. Flowers racemose; sepals slightly saccate, thin and colored; petals yellow, rather showy. Pods terete, elongated; stigmas 2-lobed. Cotyledons incumbent. [Name from the Greek words meaning rush and a kind of cabbage.]

A genus of 3 or 4 closely related species, natives of the Rocky Mountains and Great Basin regions. Type species, *Schoenocrambe linifolia* (Nutt.) Greene.

1. *Schoenocrambe linifolia* (Nutt.) Greene. *Schoenocrambe* or *Rush* Mustard. Fig. 1935.

Nasturtium linifolium Nutt. Journ. Acad. Phila. 7: 12. 1834.

Sisymbrium linifolium Nutt. in Torr. & Gray, N. Amer. Fl. 1: 91. 1838.

Schoenocrambe linifolia Greene, Pittonia 3: 127. 1896.

Schoenocrambe pinnata Greene, Pittonia 3: 127. 1896.

Plants at first simple, freely branching in age, glaucous and glabrous, the stems and branches slender, 3–5 dm. high. Leaves linear or linear-lanceolate, narrowed to the base, entire or the lower pinnatifid; racemes becoming elongated; pedicels 4–6 mm. long; sepals 5 mm. long; petals 8–10 mm. long; pods ascending, 2.5–4 cm. long, 1 mm. broad.

Dry rocky hillsides, Upper Sonoran Zone; eastern Washington and Oregon to Nevada, Wyoming, and New Mexico. Type locality: "Head of Salmon River, in dry soils," Montana. May–July.

5. *STREPTÁNTHUS* Nutt. Journ. Acad. Phila. 5: 209. 1825.

Glabrous or pubescent, annual or perennial herbs, the pubescence, when present, unbranched. Leaves, at least the upper, usually clasping the stem. Flowering inflorescence usually racemose rather than corymbose. Sepals often brightly colored, sometimes dissimilar. Petals various, often narrow with crisped blade. Stamens often in 3 pairs according to length, the longest pair frequently connate by their filaments and bearing reduced or abortive anthers. Fruiting inflorescence racemose, elongating, sometimes more or less bracteate. Pods linear, flattened parallel to the septum, erect, divaricate or pendent, sessile or with a short, thick stipe. Style usually short. Stigma entire or inconspicuously

2-lobed, the lobes developed over the valves. Seeds flattened, usually winged. [Greek, meaning twisted flower, in reference to the petals.]

A genus of about 25 species, native to the western and particularly the southwestern United States. Type species, *Streptanthus maculatus* Nutt.

Lower leaves and stems glabrous.

At least some of the upper leaves auriculate-clasping at the base.

Filaments of all the stamens distinct.

Middle stem leaves broad; pods not sharply reflexed.

Flowers rarely borne in the axils of the upper leaves; sepals usually setose at apex; petals with narrow blades; stamens nearly equal.

Stem leaves not conspicuously crowded on the stem.

Annual or biennial; pods 1.5–2.5 mm. broad, widely spreading.

1. *S. campestris*.

Perennial; radical leaves tufted at the base; pods erect or ascending, 3–4 mm. broad.

2. *S. cordatus*.

Stem leaves conspicuously crowded, longer than the internodes, ovate-cordate.

3. *S. barbatus*.

Flowers, at least some of them, borne in the axils of the upper leaves; sepals not setose at apex; petals with broad, flat blades; stamens in 3 unequal pairs.

Pods spreading or recurved; common plants of wide distribution.

5. *S. tortuosus*.

Pods erect; slender plants of the high Sierra Nevada.

6. *S. gracilis*.

Middle stem leaves linear or pinnate with linear divisions; pods sharply reflexed.

19. *S. diversifolius*.

Filaments, of the longest stamens at least, united.

Seeds distinctly wing-margined all around.

7. *S. batrachopus*.

Seeds not winged, or narrowly margined at the apex.

Calyx regular or nearly so.

Pods erect or ascending, straight or more often somewhat incurved.

8. *S. Breweri*.

Pods spreading or reflexed, more or less strongly recurved.

Leaves broadly elliptic-ovate to ovate, clasping; seeds often winged at apex.

9. *S. hesperidis*.

Leaves linear or the lowest linear-lanceolate, all but the lowest merely sessile or narrowed at the base.

10. *S. barbiger*.

Calyx irregular.

Sepals with the three upper connivent, the lower one spreading.

Sepals purplish to white; pedicels rarely 1 cm. long.

11. *S. glandulosus*.

Sepals very dark purple; pedicels over 1 cm. long.

12. *S. niger*.

Sepals in 2 pairs, the outer suborbicular, the inner ovate, acute.

18. *S. polygaloides*.

None of the leaves auriculate-clasping.

4. *S. Howellii*.

Lower leaves and stems more or less setose or hirsute.

Pods erect, ascending, divaricate or descending; longer stamens connate by their filaments.

Stem leaves definitely auriculate-clasping at the base.

Terminal flowers of the raceme normal or only slightly reduced.

Racemes not conspicuously secund.

Sepals white to purple; pedicels usually not over 1 cm. long.

11. *S. glandulosus*.

Sepals very dark purple; pedicels usually over 1 cm. long.

12. *S. niger*.

Racemes conspicuously secund, flowers white or yellowish.

13. *S. secundus*.

Terminal flowers sterile forming a conspicuous dark-colored tuft composed of numerous elongated sepals.

Siliques flattened, straight, 5–7 cm. long; seeds winged; leaves pinnatifid.

14. *S. insignis*.

Siliques terete, incurved, 1.5–2 cm. long; seeds ovoid, not winged; leaves dentate.

15. *S. callistus*.

Stem leaves cuneate at base; leaves and stems densely hispid.

16. *S. hispidus*.

Pods pendent; stamens all distinct.

17. *S. heterophyllus*.

1. *Streptanthus campestris* S. Wats. Southern *Streptanthus*. Fig. 1936.

Streptanthus campestris S. Wats. Proc. Amer. Acad. 25: 125. 1890.

Annual or biennial, glabrous and glaucous. Basal leaves oblanceolate, broadly rounded, subentire or sinuately dentate, more or less setose-ciliate, the blade narrowed to a broad petiole; stem leaves much reduced, lanceolate, sagittate; sepals usually dark purple, about 1 cm. long, bristle-tipped; petals narrow, recurved, purple; filaments distinct; pedicels divergent-ascending, 1.5–2 cm. long, stout; pods somewhat flattened, spreading and curved, 7–14 cm. long, 1.5–2 mm. broad; style 1–2 mm. long; stigma slightly 2-lobed; seeds winged.

Arid Transition and Upper Sonoran Zones; Santa Barbara County, California, to Lower California. Type locality: Campo, San Diego County, California. May–June.

Streptanthus campestris var. *bernardinus* (Greene) Johnston, Plant World 22: 89. 1919. This is a lower and more slender plant than the typical species, with smaller yellow flowers, recurved somewhat irregular sepals and shorter pedicels. Arid Transition Zone, San Bernardino Mountains, California.

2. *Streptanthus cordatus* Nutt. Perennial *Streptanthus*. Fig. 1937.

Streptanthus cordatus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 77. 1838.

Streptanthus crossifolius Greene, Pittonia 3: 227. 1897.

Cartiera multiceps Greene, Leaflets Bot. Obs. 1: 226. 1906.

Cartiera leptopetala Greene, Leaflets Bot. Obs. 1: 226. 1906.

Short-lived perennial, glabrous and glaucous, the stems rather short, mostly unbranched

above the base, 3–9 dm. high. Basal leaves broadly spatulate-obovate, variously dentate, especially toward the apex, sometimes setose-ciliate; stem leaves entire or dentate toward the apex, sagittate at the base; sepals greenish or purplish, 8–10 mm. long; petals narrow, recurved, 12–15 mm. long; stamens distinct; pods strongly flattened, erect or ascending, 4–9 cm. long, about 4 mm. broad; style 2–3 mm. long; stigma distinctly 2-lobed.

Dry slopes and ridges, Upper Sonoran and Arid Transition Zones; eastern Oregon to California east of the Sierra Nevada, eastward to southern Wyoming and northern Arizona. Type locality: "Forests of the Rocky Mountains"—probably in Wyoming. May–July.

3. *Streptanthus barbatus* S. Wats. Bearded *Streptanthus*. Fig. 1938.

Streptanthus barbatus S. Wats. Proc. Amer. Acad. 24: 125. 1889.

Cartiera barbata Greene, Leaflets Bot. Obs. 1: 226. 1906.

Glabrous and glaucous, short-lived, perennial, the stems simple or somewhat branched, rather slender, 2–5 dm. high, often curved. Leaves numerous, longer than the internodes, all similar and nearly equal, cordate, sessile, clasping, 1–2.5 cm. long, entire or sparingly dentate especially toward the apex; sepals obtuse or subacute, purple, sparsely bearded at the apex, 6–8 mm. long; petals little exerted, purplish; pedicels erect or ascending, 4–6 mm. long; pods spreading, curved, 2.5–5 cm. long, 2–3 mm. wide, flattened; style 1–2 mm. long; stigma entire; seeds narrowly margined.

Transition Zone in the interior region of northern California. Type locality: "Along the Upper Sacramento." June–Aug.

4. *Streptanthus Howellii* S. Wats. Howell's *Streptanthus*. Fig. 1939.

Streptanthus Howellii S. Wats. Proc. Amer. Acad. 20: 353. 1885.

Cartiera Howellii Greene, Leaflets Bot. Obs. 1: 226. 1906.

Perennial, glabrous throughout, the stems 3–6 dm. high. Leaves obovate-spatulate below to narrowly oblong-spatulate above, 3–6 cm. long, obtuse, entire, not clasping at the base; sepals broad, 5–8 mm. long, greenish; petals with an oblong dark purple limb, not greatly exceeding the sepals; inflorescence lax, racemose; pedicels 1–1.5 cm. long, ascending; pods ascending or spreading, 5–9 cm. long; style short, stout; stigma entire.

Transition Zone; southwestern Oregon. Type locality: "Coast mountains, near the California line, in Curry County, Oregon." July–Aug.

5. *Streptanthus tortuosus* Kell. Mountain *Streptanthus*. Fig. 1940.

Streptanthus tortuosus Kell. Proc. Calif. Acad. 2: 152. pl. 46. 1863.

Streptanthus foliosus Greene, Pittonia 3: 226. 1897.

Pleiocardia tortuosa Greene, Leaflets Bot. Obs. 1: 86. 1904.

Stout annual or biennial, glabrous and more or less glaucous throughout, stems sparingly paniculate-branching above, 2–10 cm. high. Lower leaves oblanceolate, narrowed to a winged petiole, 4–8 cm. long, entire or toothed; middle stem leaves spatulate-oblong or obovate, auriculate-clasping, toothed; uppermost leaves including some bracts of the inflorescence oblong-ovate or cordate-oblong, clasping the stem by a deep closed sinus, mostly entire; flowers purplish, sepals with recurved tips, exceeded by the purple-veined, yellowish petals; pods 6–15 cm. long, 1.5–3 mm. wide, divaricate or, usually, recurved and falcate.

Transition and Canadian Zones; Sierra Nevada and Coast Ranges of California and adjacent Nevada. Type locality: "from the copper region of the Sierra Nevada Mountains." April–Sept.

Streptanthus tortuosus var. *orbiculatus* (Greene) Hall, Univ. Calif. Pub. Bot. 4: 197. 1912. Lower than the species, its stems slender and more diffusely branched from the base; flowers smaller, dark purple. Boreal Zones; southern Oregon to the North Coast Ranges and Sierra Nevada, California. Type locality: "Donner Lake, California."

Streptanthus tortuosus var. *suffrutescens* (Greene) Jepson, Man. Fl. Pl. Calif. 418. 1925. Short-lived perennial, with the main stem caudex-like and suffrutescent. Inner Coast Ranges, northern California. Type locality: Hood's Peak, Sonoma County, California.

Streptanthus tortuosus var. *flavescens* Jepson, Man. Fl. Pl. Calif. 418. 1925. Distinguished from the typical species by the yellow flowers. Sawtooth Range, California. Type locality: Coyote Pass, Tulare County, California.

6. *Streptanthus grácilis* Eastw. Alpine *Streptanthus*. Fig. 1941.

Streptanthus gracilis Eastw. Proc. Calif. Acad. III. 2: 285. 1902.

Pleiocardia fenestrata Greene, Leaflets Bot. Obs. 1: 86. 1904.

Annual, from a slender root, glabrous and glaucous, the stems simple or branched from the base, slender, 2–4 dm. high. Basal leaves orbicular to narrowly elliptical or spatulate, sinuate-dentate to obtusely lobed or lyrate; petioles long, slender; stem leaves entire to deeply lobed, the uppermost sessile and clasping; lowest flowers bracteate; calyx purple, urceolate, tips of sepals spreading; petals rose-pink with a broad blade and slender claw, conspicuously exerted; stamens in three pairs, filaments distinct; inflorescence rather shortly racemose; pedicels erect or ascending, 3–6 mm. long; pods shortly stipitate, erect or ascending, 3–7 cm. long, 1–1.5 mm. wide.

Canadian and Hudsonian Zones; southern Sierra Nevada of California. Type locality: "East Lake to Harrison's Pass," Kings-Kern Divide. July–Aug.

7. *Streptanthus batrachopus* J. L. Morr. Tamalpais *Streptanthus*. Fig. 1942.

Streptanthus batrachopus J. L. Morr. Madroño 4: 204. 1938.

Annual, glabrous and glaucous, often tinged with purple, the stems 5–15 cm. high, simple or

commonly branched from near the base, the branches mostly spreading. Lower stem leaves oblanceolate to obovate, narrowed to a short petiole or sessile, irregularly dentate, 12–25 mm. long, those subtending the branches clasping and the upper becoming reduced, linear and entire; racemes loosely flowered; sepals dark purple, 4–5 mm. long, somewhat connivent above, the tips recurved-spreading and white-margined; petals white with purple veins, 6–7 mm. long; upper pair of filaments united, the lower pair united for half their length; pod 2.5–3 cm. long, falcate-spreading; seeds winged, 2 mm. long.

Serpentine outcrops, Humid Transition Zone; Mount Tamalpais, Marin County, California. May–June.

8. *Streptanthus Brèweri* A. Gray. Brewer's *Streptanthus*. Fig. 1943.

Streptanthus Brèweri A. Gray, Proc. Calif. Acad. 3: 101. 1864.

Pleiocardia Brèweri Greene, Leaflets Bot. Obs. 1: 86. 1904.

Annual, glabrous and glaucous throughout, the stem branching from the base, 2–6 dm. high. Lower leaves broadly ovate or obovate, clasping, acute at apex, denticulate or usually entire, rather thick, 3–12 cm. long; the uppermost stem leaves lanceolate, entire, much reduced; sepals purplish, glabrous or pubescent, tips recurved; petals well exerted, narrow; longer filaments connate; fruiting pedicels 2–3 mm. long; pods erect or ascending, usually somewhat incurved, 3–5 cm. long, 1 mm. broad; stigma sessile or nearly so; seeds small, marginless or slightly winged at apex.

Upper Sonoran Zone; Inner Coast Ranges, Lake County to San Benito County, California. Type locality: "Mt. Diablo Range, near head of Arroyo del Puerto, at an altitude of 3,200 feet," Stanislaus County, California. May–June.

9. *Streptanthus hespéridis* Jepson. Jepson's *Streptanthus*. Fig. 1944.

Streptanthus hespéridis Jepson, Erythra 1: 14. 1893.

Pleiocardia hespéridis Greene, Leaflets Bot. Obs. 1: 86. 1904.

Streptanthus Brèweri var. *hespéridis* Jepson, Fl. Calif. 2: 33. 1936.

Annual, glabrous and glaucous throughout, the stems slender, divaricate-branched or simple, 2–4 dm. high. Lower leaves cordate-clasping, elliptic-ovate, usually obtuse, rather thin, the upper reduced, ovate to ovate-lanceolate; racemes loosely flowered; calyx regular; sepals 6–7 mm. long, acute, with recurved tips, green or purple, the lateral ones with scarious margins at the apex; upper petals white, the lower dark purple with purple veins and white margins; upper pair of filaments wholly connate, middle pair slender, lowest much broader; pods about 4–6 cm. long, 1–1.5 mm. broad, torulose, recurved and spreading or reflexed; seeds oblong, somewhat flattened, usually margined at apex.

Upper Sonoran Zone; Lake and Napa Counties, California. Type locality: Lower Lake, Lake County. June–July.

10. *Streptanthus bárbiger* Greene. Bearded *Streptanthus*. Fig. 1945.

Streptanthus bárbiger Greene, Pittonia 1: 217. 1888.

Mesoreanthus bárbiger Greene, Leaflets Bot. Obs. 1: 89. 1904.

Mesoreanthus fallax Greene, op. cit. 1: 218. 1904.

Mesoreanthus vimineus Greene, op. cit. 1: 218. 1904.

Glabrous and glaucous annual, or the calyx sometimes hirsute, branching well above the base, 3–6 dm. high. Lower leaves linear, often 6–10 cm. long, entire, the upper narrowly linear to almost filiform; racemes loosely flowered; pedicels erect, 2–3 mm. long; sepals similar, 6–7 mm. long, purple or rarely green, the tips recurved and white-margined; petals not crisped, upper pair white, the lower pair purple with white margins; pods spreading, and more or less recurved, 5–7 cm. long, scarcely 2 mm. wide; seeds without a winged margin.

Rocky (mainly serpentine) ridges, Upper Sonoran and Arid Transition Zones; Lake and Napa Counties, California. Type locality: Highland Springs, Lake County, California. May–July.

11. *Streptanthus glandulosus* Hook. Common Jewel Flower. Fig. 1946.

Streptanthus glandulosus Hook. Ic. Pl. 1: pl. 40. 1837.

Annual, nearly glabrous to densely setose-hirsute, especially below, the stems usually branched upwards, 2–6 dm. high, rather slender. Lower leaves petioled, narrowly oblanceolate, coarsely and saliently dentate, the teeth usually callus-tipped; upper leaves dentate to entire, lanceolate to linear, auriculate-clasping; inflorescence racemose, lax; sepals usually deep purple, sometimes nearly white, 3 upper ones connivent, the lower one spreading; petals purple or white with purple veins, the blades recurved; longest filaments connate; pods straight or curved, ascending or spreading, 5–9 cm. long, about 3 mm. wide, frequently hispid.

Upper Sonoran Zone; western central California from Sonoma and Solano Counties to San Luis Obispo County. Type locality: "Monterey, California." April–May.

Streptanthus glandulosus var. *álbidus* (Greene) Jepson, Man. Fl. Pl. Calif. 419. 1925. (*Streptanthus albidus* Greene, Pittonia 1: 62. 1887.) Glabrous or very sparsely setose, the leaves more nearly entire than in the species; sepals white; petals white with purple veining; pods erect. Upper Sonoran Zone, Santa Clara Valley, California. Type locality: "a few miles below San José."

Streptanthus glandulosus var. *pulchellus* (Greene) Jepson, Man. Fl. Pl. Calif. 420. 1925. (*Streptanthus pulchellus* Greene, Pittonia 2: 225. 1892.) Stem branched from near the base, 1–3 dm. high, lateral branches usually long, the leaves and stems densely setose-hirsute. Upper leaves clasping at the base; pods erect, usually setose. This is likely to be confused with *S. hispidus*, to which it is undoubtedly closely related. Upper Sonoran Zone, Marin County, California. Type locality: Mount Tamalpais. Some eight other segregates of this polymorphic species have been proposed by Greene.

12. *Streptanthus niger* Greene. Black Jewel Flower. Fig. 1947.

Streptanthus niger Greene, Bull. Torrey Club 13: 141. 1886.

Euclisia nigra Greene, Leaflets Bot. Obs. 1: 83. 1904.

Glabrous and glaucous throughout or minutely and sparsely setose near the base, the stems 3–9 dm. high, branching, more or less flexuous. Lower leaves linear-lanceolate, 3–6 cm. long, pinnately lobed or dentate, somewhat clasping at the base, the teeth remote, callus-tipped; upper leaves entire, linear, acute, conspicuously sagittate-clasping at the base; sepals very dark purple, smooth, somewhat irregular, 6–8 mm. long; petals with stout, thick, purple claw and small white blade; longer filaments united, their anthers small and rudimentary; pedicels slender, 5–20 mm. long; pods strongly flattened, straight or nearly so, erect or ascending, 4–7 mm. long; style very short; stigma small, entire; seeds narrowly winged.

Transition Zone; central California. Type locality: Point Tiburon. April–May.

13. *Streptanthus secundus* Greene. Tamalpais Jewel Flower. Fig. 1948.

Streptanthus secundus Greene, Fl. Fran. 261. 1891.

Euclisia secunda Greene, Leaflets Bot. Obs. 1: 83. 1904.

Annual, the stems erect, simple or sparingly branched, slender, 2–6 dm. high, hispid-hirsute on lower leaves and stem. Lower leaves linear-ob lanceolate, pinnately toothed or lobed, the upper linear-lanceolate, sparsely toothed; inflorescence racemose, many-flowered, secund; sepals yellowish, somewhat unequal, sparsely hirsute, about 6 mm. long; petals pale; longer filaments united; pedicels ascending, horizontal or somewhat recurved, 5–7 mm. long; pods strongly flattened, recurved or pendent at maturity, 4–6 cm. long.

Upper Sonoran Zone; Coast Range foothills, Marin County to Lake County, California. Type locality: "northern base of Mt. Tamalpais." April–May.

14. *Streptanthus insignis* Jepson. Plumed Streptanthus. Fig. 1949.

Streptanthus insignis Jepson, Man. Fl. Pl. Calif. 420. 1925.

Hirsute-hispid throughout, the stems usually branched, 1–3.5 dm. high. Leaves linear- to oblong-lanceolate, 2.5–6 cm. long, pectinately subpinnatifid, sessile and auriculate; racemes loosely flowered, tipped at the apex by a plume-like purple tuft composed of numerous elongated sepals of sterile flowers; pedicels 2–3 mm. long, recurved or spreading; sepals 5–6 mm. long, dark purple, sparsely short-hispid; petals exerted 3–4 mm., the claws purple, the blades white veined with purple, crisped; pods 5–7 cm. long, slightly over 2 mm. wide, compressed; seeds flat, winged.

Rocky hillsides, Upper Sonoran Zone; Inner Coast Ranges, San Benito, Fresno, and Monterey Counties, California. Type locality: "Warthan," California. April–June.

15. *Streptanthus callistus* J. L. Morr. Royal Streptanthus. Fig. 1950.

Streptanthus callistus J. L. Morr, Madroño 4: 205. 1938.

Low simple to much branched annual, 3–6 cm. high, sparsely hispid throughout. Lower leaves broadly oblong-obovate, 5–15 mm. long, sessile, coarsely dentate, often reddish, upper similar but clasping at base; racemes rather densely flowered, terminated by a conspicuous tuft composed of the modified and colored parts of sterile flowers; normal flowers on short stout pedicels; sepals lanceolate, saccate at base, green, 5 mm. long; petals bright reddish purple, prominently veined, 10 mm. long, spatulate-obovate, undulate-margined; upper pair of stamens connate nearly to the apex, and the lower pair scarcely to the middle, the lateral free; pod 15–20 mm. long, erect, incurved, terete; seeds spheroidal, not winged.

A beautiful dwarf species known only from the Mount Hamilton Range, Santa Clara County, California. April–May.

16. *Streptanthus hispidus* A. Gray. Mount Diablo Jewel Flower. Fig. 1951.

Streptanthus hispidus A. Gray, Proc. Calif. Acad. 3: 101. 1864.

Euclisia hispida Greene, Leaflets Bot. Obs. 1: 83. 1904.

Hirsute-hispid throughout, the stems usually branched, 1–2 dm. high. Leaves thick, 1–6 cm. long, obovate-cuneate, all sessile except the lowermost, these with a broad petiole, coarsely toothed toward the apex, the teeth obtuse; sepals hispid or nearly glabrous, purplish, 5–6 mm. long; petals purplish with white margins, narrow, about twice as long as the sepals; pedicels erect or ascending, 2–4 mm. long; pods strongly flattened, 3–7 cm. long, 1–2 mm. wide, hispid-hirsute.

Transition and Upper Sonoran Zones; summits of the higher peaks, Coast Ranges, central California. Type locality: on the summit of Mount Diablo, Contra Costa County. April–May.

17. *Streptanthus heterophyllus* Nutt. San Diego Streptanthus. Fig. 1952.

Streptanthus heterophyllus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 77. 1838.

Caulanthus heterophyllus Payson, Ann. Mo. Bot. Gard. 9: 298. 1923.

Annual, more or less hirsute-pubescent, especially towards the base, the stem erect, simple or sparingly branched, 3–10 dm. high. Leaves broadly linear or linear-lanceolate, pinnatifid with divaricate lobes, sinuate-dentate or subentire, all but the lowermost amplexicaul, 3–12 cm. long; inflorescence lax, racemose; sepals purple, linear-lanceolate, not saccate, nearly equal, about 9 mm. long; petals pale with purple veining, linear, recurved, 12–14 mm. long; filaments distinct; pedicels recurved or refracted, hirsute, 4–8 mm. long; pods pendent, straight, somewhat compressed, glabrous, 5–8 cm. long, 1.5–2 mm. wide.

Upper and Lower Sonoran Zones; southern California. Type locality: San Diego. March–May.

18. *Streptanthus polygaloides* A. Gray. Milkwort *Streptanthus*. Fig. 1953.*Streptanthus polygaloides* A. Gray, Proc. Amer. Acad. 6: 519. 1866.*Mitrosemia polygaloides* Greene, Leaflets Bot. Obs. 1: 89. 1904.

Annual, glabrous, the stems slender, branched upwards, 3-9 dm. high. Leaves linear, entire, the uppermost sagittate-clasping; inflorescence racemose, lax; pedicels recurved, about 3 mm. long; sepals yellow, very dissimilar, the lower large, keeled, the lateral ones very small, the upper broadly obovate, erect in anthesis; petals scarcely exceeding the sepals, yellow, often veined with red; longer filaments connate; pods straight or slightly curved, pendent, flattened-quadrangular, 2-3 cm. long, 1 mm. wide.

Upper Sonoran Zone; foothills of the Sierra Nevada, north-central California. Type locality: "along the Tuolumne River." April-May.

19. *Streptanthus diversifolius* S. Wats. Varied-leaved *Streptanthus*. Fig. 1954.*Streptanthus diversifolius* S. Wats. Proc. Amer. Acad. 17: 363. 1882.*Streptanthus linearis* Greene, Pittonia 3: 225. 1897.*Mitophyllum diversifolium* Greene, Leaflets Bot. Obs. 1: 88. 1904.

Glabrous annual, the stems slender, branching, 2-5 cm. high. Basal leaves entire, linear-filiform; stem leaves entire and linear-filiform to pinnately divided with few, remote, linear lobes; uppermost leaves and bracts of the inflorescence cordate-clasping, entire; sepals yellowish, with recurved tips; petals yellow, white or pinkish, at least one half longer than the sepals, recurved; inflorescence racemose-paniculate, lax; pedicels ascending, 5-10 mm. long; pods reflexed, strongly flattened, straight or nearly so, 3-8 cm. long, 1-2 mm. wide.

Upper Sonoran Zone in the foothills of the Sierra Nevada, central California. Type locality: Consumnes River, California. April-May.



1937. *Streptanthus cordatus*
1938. *Streptanthus barbatus*

1939. *Streptanthus Howellii*
1940. *Streptanthus tortuosus*

1941. *Streptanthus gracilis*
1942. *Streptanthus batrachopus*



1943. *Streptanthus Breweri*
1944. *Streptanthus hesperidis*
1945. *Streptanthus barbiger*

1946. *Streptanthus glandulosus*
1947. *Streptanthus niger*
1948. *Streptanthus secundus*

1949. *Streptanthus insignis*
1950. *Streptanthus callistus*
1951. *Streptanthus hispidus*

6. *STREPTANTHÉLLA* Rydb. Fl. Rocky Mts. 364. 1917.

Glabrous, annual herbs with entire or shallowly dentate leaves and branched stems. Flowers small. Pods pendent on recurved pedicels; stipe none; valves strongly compressed, narrowed at the apex to a conspicuous beak that simulates a persistent style, dehiscent at the base but remaining attached at the apex. Seeds flattened, narrowly winged; cotyledons oblique. [Greek, diminutive of *Streptanthus*.]

A monotypic genus of western United States and northwestern Mexico.

1. *Streptanthella longiróstris* (S. Wats.) Rydb. *Streptanthella*. Fig. 1955.

Arabis longirostris S. Wats. Bot. King Expl. 17. pl. 2. 1871.

Streptanthus longirostris S. Wats. Proc. Amer. Acad. 25: 127. 1889.

Guillenia rostrata Greene, Leaflets Bot. Obs. 1: 228. 1906.

Streptanthella longirostris Rydb. Fl. Rocky Mts. 364. 1917.

Thelypodium longirostris Jepson, Man. Fl. Pl. Calif. 413. 1925.

Stem usually much branched above, slender, 3–6 dm. high. Leaves deciduous at maturity; lower stem leaves narrowly oblanceolate, sinuate-dentate or repand, 2–5 cm. long; upper leaves reduced, entire; sepals greenish or tipped with purple, 3–6 mm. long, lateral pair saccate at base; petals yellowish, linear-spatulate, one-fourth longer than sepals; inflorescence lax, shortly racemose, elongating in fruit; pedicels soon recurved, slender, 2–5 mm. long; pods 3–7 cm. long, 1–2 mm. wide; stigma nearly entire.

Upper and Lower Sonoran Zones; eastern Washington and eastern Oregon south to the Mojave Desert, including the arid Inner Coast Ranges of Fresno and Monterey Counties, California, east to Wyoming, Arizona, and adjacent Mexico. Type locality: Steamboat Springs, Nevada. March–June.

Streptanthella longirostris var. *derelicta* J. T. Howell, Leaflets West. Bot. 2: 57. 1937. Leaves at least all but the upper pinnatifid into a few narrow divaricate lobes. Colorado Desert, southern California and adjacent Arizona, Lower California and Sonora, Mexico. Type locality: on sand hills near La Quinta, Riverside County, California.

7. *CAULÁNTHUS* S. Wats. Bot. King Expl. 27. 1871.

Mostly annual herbs, frequently glabrous and glaucous or sometimes pubescent with simple hairs. Basal leaves usually not forming a conspicuous rosette. Flowers purple, white, or yellow, racemose. Sepals equal or quite unequal. Petals frequently narrow and crisped. Pods erect, divaricate or reflexed, terete or only slightly flattened, often torulose, sessile or nearly so; style usually short; stigma entire or 2-lobed with the lobes extended over the middle of the valves; cells of the septum usually short and the boundaries straight. Cotyledons usually obliquely incumbent. [From the two Greek words meaning stem and flower, in allusion to cauliflower, since some of the species may be used as a substitute for cabbage.]

A genus of about 18 species, native to the arid regions of western North America. Type species, *Caulanthus crassicaulis* (Torr.) S. Wats.

Stem leaves sessile, auriculate at the base.

Stems not distinctly inflated.

Stigmas entire or shallowly 2-lobed.

Plants glabrous or inconspicuously short-pubescent.

Pods erect or divaricate.

Pods reflexed.

Plants hirsute; stigma very small, entire.

Stigma distinctly 2-lobed.

Pods 2–4 cm. long; cotyledons 3-parted.

Pods 4–14 cm. long; cotyledons not 3-parted.

Pods usually reflexed.

Calyx yellowish; stigma distinctly but not deeply 2-lobed.

Calyx purple; stigma deeply 2-lobed.

Pods erect, 8–13 cm. long.

Stems conspicuously inflated.

Stem leaves sessile or petioled, not auriculate at base.

Stems more or less inflated.

Stigma shallowly 2-lobed; calyx glabrous.

Stigma deeply 2-lobed; calyx hispid, rarely glabrous in *crassicaulis*.

Annual; leaves more or less hispid.

Short-lived perennial; leaves glabrous.

Stems not inflated. (See also *C. major*.)

Plants glabrous; annual.

Plants densely pilose.

1. *C. amplexicaulis*.

2. *C. Cooperi*.

3. *C. stenocarpus*.

4. *C. californicus*.

5. *C. simulans*.

6. *C. Coulteri*.

7. *C. Lemmonii*.

8. *C. inflatus*.

9. *C. major*.

10. *C. Hallii*.

11. *C. crassicaulis*.

12. *C. glaucus*.

13. *C. pilosus*.

1. *Caulanthus amplexicaulis* S. Wats. Claspingleaved Caulanthus. Fig. 1956.

Caulanthus amplexicaulis S. Wats. Proc. Amer. Acad. 17: 364. 1882.

Pleiocardia magna Greene, Leaflets Bot. Obs. 1: 87. 1904.

Euclisia amplexicaulis Greene, Leaflets Bot. Obs. 1: 84. 1904.

Streptanthus amplexicaulis Jepson, Man. Fl. Pl. Calif. 417. 1925.

Annual, glabrous throughout, more or less glaucous, the stem slender, somewhat flexuous,

2-4 dm. long. Stem leaves suborbicular to ovate or oblong, obtuse, shallowly sinuate-dentate, cordate-clasping, 2-5 cm. long; flowers few and remote; sepals more or less saccate, 7 mm. long; petals purplish, broadly linear, about 11 mm. long, upper part strongly crisped; pedicels ascending or divaricate, 12-20 mm. long; pods spreading, curved, terete, slender, 6-8 cm. long; stipe less than 1 mm. long, stigma small, entire.

Dry, gravelly slopes, mainly in the Transition Zone; mountains of southern California. Type locality: San Bernardino Mountains. April-July.

2. *Caulanthus Coöperi* (S. Wats.) Payson. Cooper's Caulanthus. Fig. 1957.

Thelypodium Cooperi S. Wats. Proc. Amer. Acad. 12: 246. 1877.

Guillenina Cooperi Greene, Leaflets Bot. Obs. 1: 228. 1906.

Caulanthus Cooperi Payson, Ann. Mo. Bot. Gard. 9: 293. 1923.

Annual, glabrous or sparingly short-pubescent, somewhat glaucous, the stem slender, flexuous, 2-6 dm. long. Lowermost stem leaves oblong to oblanceolate, narrowed to a broad petiole, entire or sinuate-lobed, obtuse, 2-6 cm. long; other stem leaves sagittate, mostly entire, acute; inflorescence lax, racemose; pedicels stout, recurved, 1-3 mm. long; sepals greenish, scarcely saccate, 6-7 mm. long; petals pale yellow, linear-spatulate, 2-3 mm. longer than the sepals; pods deflexed, terete, glabrous or short-pubescent, 2-4.5 cm. long, sessile; style 1-2 mm. long; stigma small, shortly 2-lobed.

Upper and Lower Sonoran Zones; Mojave and Colorado Deserts, California, to southern Nevada and Western Arizona. Type locality: near Fort Mojave, California. March-April.

3. *Caulanthus stenocarpus* Payson. Slender-podded Caulanthus. Fig. 1958.

Caulanthus stenocarpus Payson, Ann. Mo. Bot. Gard. 9: 300. 1923.

Annual, more or less densely hirsute-pubescent with flattened trichomes, the stems erect, slender, simple or branched, 3-4 dm. high. Stem leaves few, linear-lanceolate, subentire, sessile, amplexicaul, 1-2 cm. long; inflorescence lax, racemose; pedicels recurved, 1-2 mm. long, hirsute; flowers pendent; sepals purple, linear-lanceolate, not saccate, nearly equal, glabrous or nearly so, about 4 mm. long; petals veined with purple, broadly linear, about 6 mm. long; pods divaricate-descending or pendent, terete or slightly quadrangular, 2-4.5 cm. long, 1 mm. or less wide, sparsely retrorse-pubescent with flattened trichomes, or glabrous; style 1-2 mm. long; stigma small, entire.

Dry hillsides, Sonoran Zones; San Diego County, California. Type locality: dry hillsides near Bernardo. May.

4. *Caulanthus californicus* (S. Wats.) Payson. California

Caulanthus. Fig. 1959.

Stanfordia californica S. Wats. Bot. Calif. 2: 479. 1880.

Streptanthus californicus Greene, Fl. Fran. 256. 1891.

Annual, glabrous or very sparingly pilose near the base, the stem erect, branched, 2-4 dm. high. Basal leaves oblanceolate, sinuately lobed to pinnatifid, obtuse, 3-6 cm. long; stem leaves ovate to oblong, amplexicaul, shallowly dentate, obtuse; inflorescence lax, racemose; pedicels pilose, 5-10 mm. long; sepals purple-tipped, unequal, membranous and saccate near the base, 7-9 mm. long; petals whitish, but little longer than the sepals, claw dilated, blade small, crisped; longer pair of filaments sometimes slightly united at the base; pods ascending or deflexed, straight, 2-4 cm. long, 2-3 mm. wide, slightly compressed or quadrangular.

Dry plains and hillsides, Lower Sonoran Zone; southern San Joaquin Valley and eastern San Luis Obispo County, California. Type locality: near Tulare. Feb.-May.

5. *Caulanthus simulans* Payson. Payson's Caulanthus. Fig. 1960.

Caulanthus simulans Payson, Ann. Mo. Bot. Gard. 9: 295. 1923.

Streptanthus simulans Jepson, Man. Fl. Pl. Calif. 417. 1925.

Annual, densely short-hirsute below, sparingly so above, the stem much branched from near the base and upwards, 3-4 dm. high. Stem leaves oblong to lanceolate, sessile, sagittate at the base, subentire or sinuate-dentate; inflorescence racemose; pedicels hirsute, somewhat recurved, 3-5 mm. long, sparsely hirsute; petals whitish, broadly linear or narrowly spatulate, somewhat crisped, 8-10 mm. long; pods straight, divaricate-descending, terete, glabrous, 4-6.5 cm. long; stigma definitely 2-lobed.

Transition and Upper Sonoran Zones; Santa Rosa and Cuyamaca Mountains, southern California. Type locality: "Coyote Canyon, El Toro Mountain, California." March-June.

6. *Caulanthus Coulteri* S. Wats. Coulter's Caulanthus. Fig. 1961.

Caulanthus Coulteri S. Wats. Bot. King Expl. 27. 1871.

Streptanthus Coulteri Greene, Fl. Fran. 257. 1891.

Annual, more or less densely hirsute-pubescent, especially toward the base of the stem, this erect, simple or sparingly branched, 3-7 dm. high. Stem leaves broadly linear to oblong or oblanceolate, 4-8 cm. long, all but the lowermost amplexicaul, sinuate-dentate to subentire; inflorescence lax, racemose; pedicels hirsute, reflexed, 5-10 mm. long; sepals purple in the bud, becoming lighter in anthesis, glabrous or hirsute, unequal, scarcely saccate, 7-15 mm. long;

petals light, conspicuously veined with purple, broadly linear, crisped, much exceeding the sepals; filaments of long stamens united; pods divergent-descending to pendent, rarely erect, glabrous, stout, subterete, or slightly flattened, 5–10 cm. long; style about 1 mm. long.

Upper and Lower Sonoran Zones; Madera and San Luis Obispo Counties to Saugus, Los Angeles County, California. Type locality: "southern California." March–May.

7. *Caulanthus Lemmonii* S. Wats. Lemmon's Caulanthus. Fig. 1962.

Caulanthus Lemmonii S. Wats. Proc. Amer. Acad. 23: 261. 1888.

Streptanthus Parryi Greene, Fl. Fran. 257. 1891.

Streptanthus Lemmonii Jepson, Man. Fl. Pl. Calif. 416. 1925.

Streptanthus Coulteri var. *Lemmonii* Jepson, Fl. Calif. 2: 27. 1936.

Annual, pilose on the lower leaves and towards the base of the stem, otherwise glabrous and glaucous, the stem erect, 2–8 dm. high. Leaves sessile, auriculate-clasping, dentate, denticulate or entire, 2–10 cm. long; inflorescence racemose; pedicels frequently hispid, at length 10–20 mm. long, ascending in the bud, reflexed in anthesis and curved sharply upwards in fruit; sepals dark purple in the bud, fading to flesh color in anthesis, unequal, 7–15 mm. long; petals well exerted, crisped, white with dark purple veins; filaments of long stamens united; pods erect, glabrous, subterete or slightly compressed, 8–13 cm. long, 2–3 mm. wide.

Dry hillsides, Upper Sonoran Zone; Monterey and San Luis Obispo Counties, California. Type locality: near Cholame, San Luis Obispo County. March–May.

8. *Caulanthus inflatus* S. Wats. Squaw Cabbage. Desert Candle. Fig. 1963.

Caulanthus inflatus S. Wats. Proc. Amer. Acad. 17: 364. 1882.

Streptanthus inflatus Greene, Fl. Fran. 257. 1891.

Annual, glabrous or sparingly hirsute near the base, the stem erect, stout, mostly unbranched, becoming strongly inflated upwards, hollow, 3–6 dm. high. Stem leaves ovate to oblong, mostly acute, entire, 3–7 cm. long; inflorescence racemose, pedicels stout, more or less villous, ascending, about 3 mm. long; sepals purple in the bud, in flower white with purple tips, glabrous, slightly saccate, 8–10 mm. long; petals white, broadly linear, crisped near the apex, little exceeding the sepals; filaments of longer pair of stamens coherent; pods 6–10 cm. long, erect or ascending; stigma deeply 2-lobed.

Sandy or gravelly soils, Sonoran Zones; Inner Coast Ranges, Monterey County and southern edges of San Joaquin Valley to the Mojave Desert, California, and southwestern Nevada. Type locality: Mojave Desert, California. March–May.

9. *Caulanthus major* (M. E. Jones) Payson. Slender Wild Cabbage. Fig. 1964.

Caulanthus crassicaulis var. *major* M. E. Jones, Proc. Calif. Acad. III. 5: 623. 1895.

Caulanthus major Payson, Ann. Mo. Bot. Gard. 9: 291. 1923.

Streptanthus major Jepson, Man. Fl. Pl. Calif. 415. 1925.

Short-lived perennials, glabrous and glaucous throughout, the stems erect, simple or sparingly branched, hollow, rarely slightly inflated, 4–9 cm. high. Leaves oblanceolate in outline, entire, lyrate or runcinate, 5–15 cm. long, narrowed to a slender petiole; upper leaves much reduced; inflorescence racemose; pedicels very stout, ascending, 3–5 mm. long; sepals purple or yellowish tipped with purple, not saccate, 7–10 mm. long; petals purplish, broadly linear or with slightly dilated crisped blades, about twice as long as the sepals; pods erect or ascending, stout, 8–13 mm. long.

Dry slopes and washes, Lower Sonoran Zone; desert slopes of the San Gabriel and San Bernardino Mountains, southern California, to southern Utah. Type locality: Mojave Desert, California. June–July.

10. *Caulanthus Hallii* Payson. Hall's Caulanthus. Fig. 1965.

Caulanthus Hallii Payson, Ann. Mo. Bot. Gard. 9: 290. 1923.

Streptanthus Hallii Jepson, Fl. Calif. 2: 23. 1936.

Annual, sparingly hispid on the leaves and pedicels, the stem glabrous, somewhat glaucous, with a tendency to become inflated, erect, 5–8 dm. high. Stem leaves 4–16 cm. long, irregularly and deeply lacinate-pinnatifid or dentate with few coarse lobes; inflorescence lax, racemose; pedicels widely divergent, 6–18 mm. long; sepals yellowish, hispid-hirsute, not saccate, 6 mm. long; petals yellow, narrowly spatulate, about 9 mm. long; filaments distinct; pods terete, divaricate, glabrous, 7–11 cm. long; style 1.5–2 mm. long.

Washes and desert slopes, Upper Sonoran Zone; western edges of the Colorado Desert from the Little San Bernardino Mountains to San Felipe, California. Type locality: Coyote Canyon, El Toro Mountain, California. April–May.

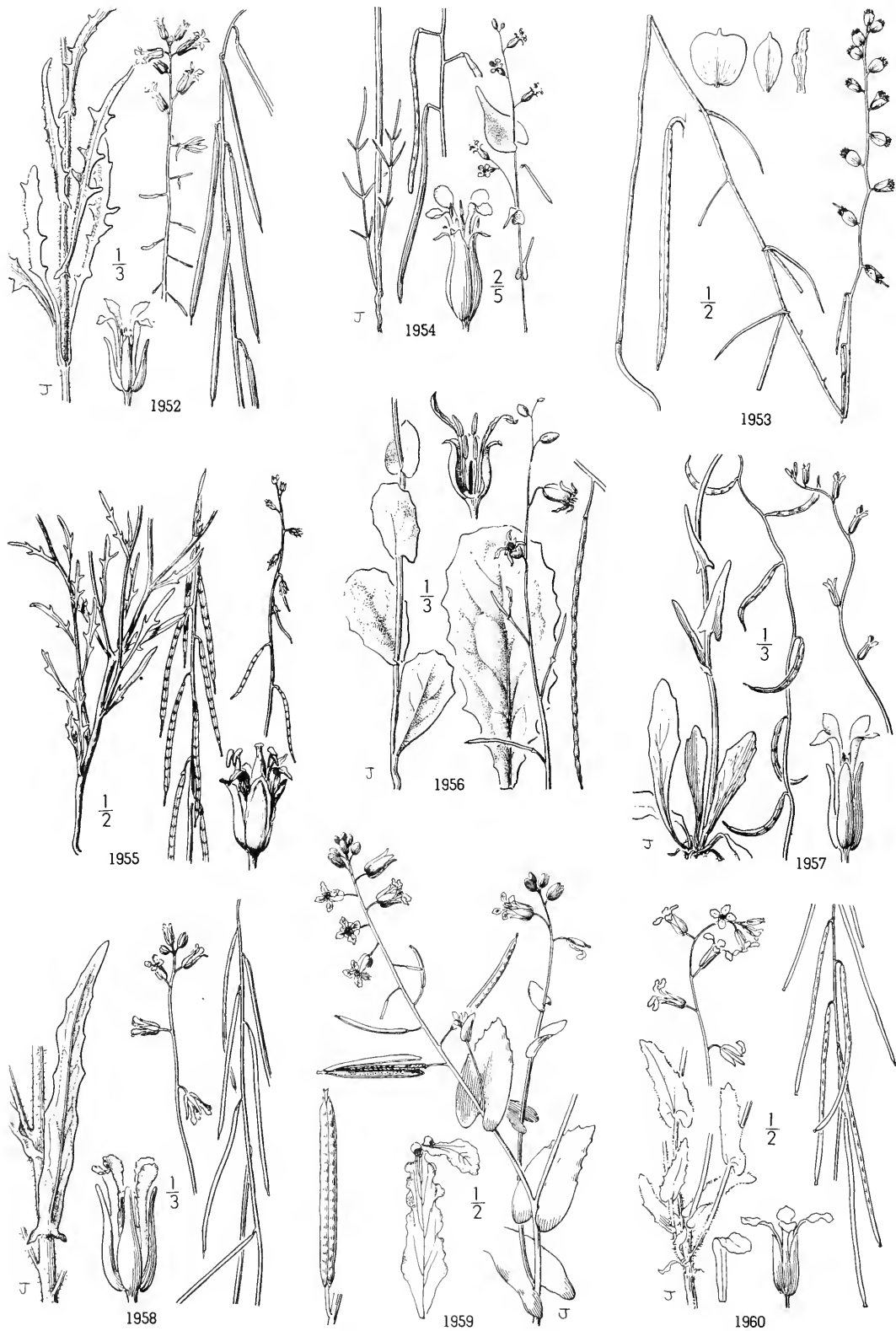
11. *Caulanthus crassicaulis* (Torr.) S. Wats. Wild Cabbage. Fig. 1966.

Streptanthus crassicaulis Torr. in Stansbury's Exp. 383, pl. 1. 1852.

Caulanthus crassicaulis S. Wats. Bot. King Expl. 27. 1871.

Caulanthus senilis Heller, Muhlenbergia 8: 137, pl. 16. 1913.

Short-lived perennial, glabrous and glaucous, the stems erect, unbranched, stout, more or less inflated, 3–10 dm. high. Basal leaves rosulate, primary basal leaves oblanceolate, subentire or sinuate-dentate, 3–5 cm. long, the secondary and lowermost stem leaves deeply and irregularly lyrate or runcinate, 5–15 cm. long; upper leaves reduced; inflorescence racemose; pedicels very stout, 3–5 mm. long, more or less hirsute; sepals purplish, densely hirsute, not saccate,



1952. *Streptanthus heterophyllus*
1953. *Streptanthus polygaloides*
1954. *Streptanthus diversifolius*

1955. *Streptanthella longirostris*
1956. *Caulanthus amplexicaulis*
1957. *Caulanthus Cooperi*

1958. *Caulanthus stenocarpus*
1959. *Caulanthus californicus*
1960. *Caulanthus simulans*

scarious-margined, 10–15 mm. long; petals purplish or brownish, broadly linear, channelled, 15–20 mm. long; pods erect or ascending, rather stout, 10–13 cm. long; stigma broadly 2-lobed, the lobes nearly 1 mm. long.

Upper Sonoran and Transition Zones; Clark Mountains, Inyo County, California, to western Nevada, Wyoming, and Colorado. Type locality: "East shore of Salt Lake, Utah." June–July.

12. *Caulanthus glaucus* S. Wats. Glaucous Caulanthus. Fig. 1967.

Caulanthus glaucus S. Wats. Proc. Amer. Acad. 17: 364. 1882.

Streptanthus glaucus Jepson, Man. Fl. Pl. Calif. 415. 1925.

Glabrous and conspicuously glaucous throughout, the stem erect, simple or sparingly branched, rather stout, 3–8 dm. high. Lower leaves orbicular or ovate, obtuse, 3.5–7 cm. long, sometimes lobed at the base, these as well as the narrower upper leaves conspicuously petioled; inflorescence racemose; pedicels slender, 7–15 mm. long, erect or ascending; sepals greenish or purplish, not saccate, 8–10 mm. long; petals greenish, broadly linear, recurved at the apex, about 1.5 cm. long; pods widely divaricate, frequently arcuate, 6–8 cm. long, rather slender; stigma deeply 2-lobed.

Rocky slopes, Upper Sonoran and Transition Zones; southeastern Oregon, western Nevada, and the White Mountains, California, east to southern Utah. Type locality: Candelaria, Esmeralda County, Nevada. May.

13. *Caulanthus pilosus* S. Wats. Hairy Caulanthus. Fig. 1968.

Caulanthus pilosus S. Wats. Bot. King Expl. 27. 1871.

Streptanthus pilosus Jepson, Man. Fl. Pl. Calif. 415. 1925.

Biennial or short-lived perennial, sparingly pilose to densely hirsute, especially near the base. Lower leaves petioled, coarsely toothed or pinnatifid, 4–15 cm. long, the upper leaves reduced, narrow; inflorescence racemose; pedicels ascending, 5–8 mm. long; sepals green or purplish, more or less densely pilose, scarious-margined, 5–8 mm. long; petals white or veined with purple, narrowly spatulate, 7–10 mm. long; pods ascending or widely divaricate, frequently arcuate, 6–13 cm. long; stigma conspicuously 2-lobed.

Upper Sonoran Zone; southwestern Idaho and eastern Oregon to western Nevada and Darwin Valley, Inyo County, California. Type locality: Truckee Valley, Nevada. April–June.

8. SUBULÀRIA L. Sp. Pl. 642. 1753.

Small submerged aquatic annual herbs, with basal subulate leaves, and minute white racemose flowers terminating a naked scape. Stamens 6. Style none. Silicles short-stipitate, ovoid to spherical, the valves convex, 1-ribbed dorsally, the partition broad. Seeds few in each cell, marginless; cotyledons narrow, incumbent. [Name Latin, meaning awl, from the awl-shaped leaves.]

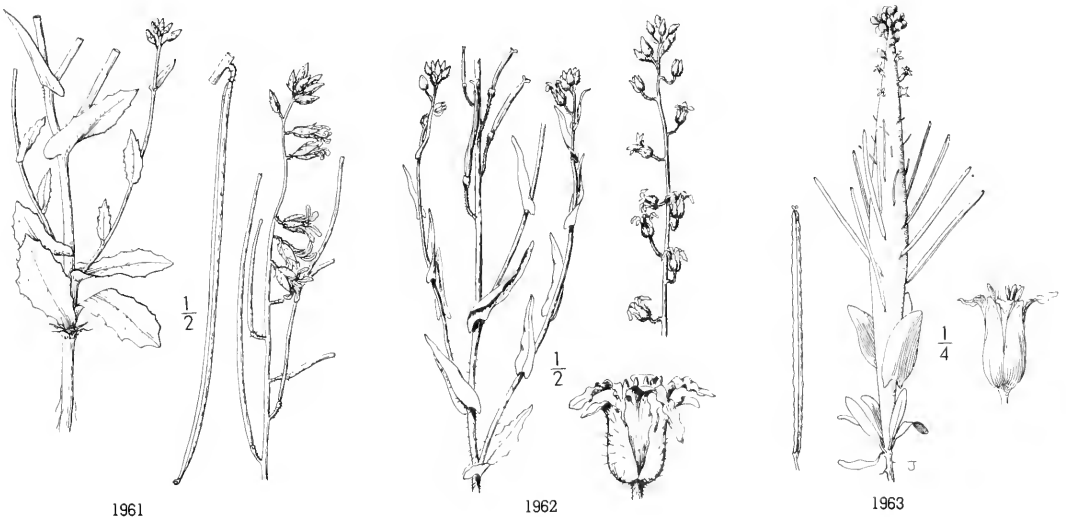
A monotypic species of the northern hemisphere.

1. *Subularia aquatica* L. Water Awlwort. Fig. 1969.

Subularia aquatica L. Sp. Pl. 642. 1752.

Tufted, glabrous, the scapes 3–10 cm. high, simple. Leaves nearly cylindrical, 15–30 mm. long; flowers few; pedicels slender, 2–6 mm. long; pods 2–3 mm. long.

Growing in shallow water in the margins of clear cold lakes, Canadian Zone; British Columbia to the Sierra Nevada, California, east to Newfoundland, Maine, and Wyoming. Type locality: European. June–August.



1961. *Caulanthus Coulteri*

1962. *Caulanthus Lemmonii*

1963. *Caulanthus inflatus*

9. HYMENOPHYSA C. A. Mey. in Ledeb. Fl. Alt. 3: 180. 1831.

Perennial herbs, pubescent with simple hairs, the stems branching, leafy. Leaves sessile or clasping, entire or dentate. Flowers in corymbose racemes, on slender pedicels, white. Sepals alike at base, scarious-margined. Stamens 6. Silicle subglobose and inflated, dehiscent or indehiscent; style slender. Seeds 2-4, ellipsoid, faintly reticulate; cotyledons incumbent.

A monotypic Old World genus.

1. *Hymenophysa pubescens* C. A. Mey. Globe-podded Hoary Cress. Fig. 1970.

Hymenophysa pubescens C. A. Mey. in Ledeb. Fl. Alt. 3: 181. 1831.

Perennial with short branching caudex, the flowering stems branching, at least above, leafy. Leaves oblong, 10-35 mm. long, acutish or obtuse at apex, auriculate-clasping at base, finely serrate-dentate, cinereous-puberulent; racemes corymbose; flowers 2 mm. high, rather crowded; fruiting pedicels slender, 3-8 mm. long; pods subglobose, 3-4 mm. in diameter, puberulent; seeds brown, faintly reticulate.

Fields, especially in alfalfa, and waste land, adventive from Eurasia; eastern Washington, Klamath Basin, Oregon, and Sacramento Valley, California. June-Aug.

10. LEPÍDIUM [Tourn.] L. Sp. Pl. 643. 1753.

Erect or diffuse, annual, biennial, or perennial herbs, or rarely suffrutescent, with pinnatifid, lobed or entire leaves, and racemose, white or greenish flowers. Petals small, rarely wanting. Stamens often fewer than 6. Stigmas sessile or nearly so. Silicles oblong or obovate, flattened contrary to the partition, more or less emarginately winged at the apex; valves keeled, dehiscent. Seeds 1 in each cell, flattened; cotyledons incumbent or rarely accumbent. [Greek, meaning a little scale, from the flat scale-like pod.]

A genus of about 65 species, of wide geographical distribution. Type species, *Lepidium latifolium* L.

Stigmas on slender, sometimes short but evident, persistent styles.

Pods not notched or winged at the apex.

Pods cordate at base; stem leaves clasping; flowers white.

1. *L. Draba*.

Pods not cordate at base; stem leaves not clasping; flowers yellow.

2. *L. Jaredii*.

Pods notched at the apex.

Flowers yellow.

3. *L. flavum*.

Flowers white.

Plants annual, pubescent; introduced species.

Pods not winged; upper leaves cordate-clasping.

4. *L. perfoliatum*.

Pods winged all around; upper leaves sagittate-clasping.

5. *L. campestre*.

Plants perennial or suffrutescent; native species.

Stems herbaceous; pods oval, 2-4 mm. long.

Plants puberulent or hirsutulous; pods 2 mm. long.

6. *L. montanum*.

Plants glabrous; pods 3.5-4 mm. long.

7. *L. Jonesii*.

Stems woody below; pods obcordate, 6 mm. long.

8. *L. Fremontii*.

Stigmas sessile or subsessile; style, if any, short and thick.

Pods merely emarginate at the apex (rather deeply so and somewhat winged in *bipinnatifidum*).

Pedicels slender, terete or nearly so.

Petals present, equaling or exceeding the sepals.

Cotyledons accumbent.

9. *L. virginicum*.

Cotyledons incumbent.

Petals narrowly spatulate, about equaling the sepals.

Basal leaves pinnately parted, the segments often toothed.

10. *L. Menziesii*.

Basal leaves merely toothed or sometimes somewhat pinnatifid.

11. *L. texanum*.

Petals obovate, exceeding the sepals.

12. *L. idahoense*.

Petals none, or if present, rudimentary and much shorter than the sepals.

13. *L. densiflorum*.

Pedicels strongly flattened.

Pods pubescent.

14. *L. lasiocarpum*.

Pods glabrous.

Petals present; fruiting raceme loose.

15. *L. nitidum*.

Petals none; fruiting raceme rather dense.

16. *L. bipinnatifidum*.

Pods conspicuously winged at apex with two lobes or teeth; plants mostly of alkaline or saline soils.

Wings of the pod approximate, the sinus very narrow; pods strongly reticulate.

Body of the pod little exceeding the wings in length.

17. *L. latipes*.

Body of the pod much exceeding the short wings.

18. *L. dictyotum*.

Wings of the pod represented by acute, divergent teeth; pods finely reticulate.

Teeth very short, widely divergent.

19. *L. oxycarpum*.

Teeth about as long as the body of the pod.

20. *L. acutidens*.

1. *Lepidium Draba* L. Hoary Cress. Fig. 1971.

Lepidium Draba L. Sp. Pl. 645. 1753.

Cardaria Draba Desv. Journ. Bot. 3: 163. 1813.

Perennial, hoary-pubescent throughout, the stems erect or ascending, 2-5 dm. high, branched

at the inflorescence. Leaves oblong or lanceolate-oblong, shallowly dentate or entire, 3–5 cm. long, the lower petioled, the upper clasping; pedicels slender, 6–12 mm. long, spreading; racemes short, corymbose; petals white, 2 mm. long; pods broadly ovoid or cordate, 3–4 mm. broad; valves papillose, keeled, wingless; style slender, 1–2 mm. long.

In waste places and fields; well established in many localities in Washington, Oregon, and California. Native of Europe. April–July.

Lepidium repens (Schrenck) Boiss. Fl. Orien. 1: 356. 1867. Pods lens-shaped, not at all cordate at base, otherwise closely resembling *Lepidium Draba* L. Fields and waste places, Sacramento Valley, California.

2. *Lepidium Jarédii* Brandg. Jared's Pepper-grass. Fig. 1972.

Lepidium Jaredii Brandg. Zoe 4: 398. 1894.

Annual, with slender, erect, glaucous, pubescent stems, usually branching from the base, 1–2 dm. high. Leaves narrowly lanceolate, entire or somewhat toothed; flowers in rather loose racemes; pedicels filiform, 10 mm. long; petals yellow, 2 mm. long; pods orbicular, not emarginate; style evident.

Dry hillsides, Upper Sonoran Zone; southern Inner Coast Ranges and San Joaquin Valley, California. Type locality: near Goodwin, San Luis Obispo County, California. March–April.

3. *Lepidium flavum* Torr. Yellow Pepper-grass. Fig. 1973.

Lepidium flavum Torr. Pacif. R. Rep. 4: 67. 1856.

Sprengeria flava Greene, Leaflets Bot. Obs. 1: 198. 1905.

Sprengeria Watsoniana Greene, Leaflets Bot. Obs. 1: 199. 1905.

Sprengeria minuscula Greene, loc. cit.

Glabrous prostrate annual, the stems branched from the base, 1–4 dm. long, brittle at the joints. Basal leaves rosulate, lanceolate or oblong-lanceolate, slightly fleshy, pinnatifid with short rounded lobes and narrow sinuses; the stem leaves toothed; inflorescence often corymbosely branched; racemes dense, subcapitate; petals bright yellow; pod broadly elliptical, 3 mm. long, inconspicuously winged, glabrous, finely reticulate, bifid at the apex, the teeth acute, the sinus open.

Sandy bottoms of washes or winter pools, Lower Sonoran Zone; desert regions, from Inyo County, California, to western Nevada, south to Lower California. Type locality: Mojave River, California. March–June.

4. *Lepidium perfoliatum* L. Round-leaved Pepper-grass. Fig. 1974.

Lepidium perfoliatum L. Sp. Pl. 643. 1753.

Annual or biennial, glabrous and glaucous, the stems diffusely branched, 2–6 dm. high. Basal leaves 2-pinnatifid, with linear segments; upper stem leaves round-ovate, cordate-clasping, entire; pedicels spreading; petals yellow, 1 mm. long; pods rhombic-orbicular, about 4 mm. long, minutely notched.

In waste places, sparingly introduced in the Pacific States, but becoming well established in some localities, especially eastern Oregon and southern California. March–May.

5. *Lepidium campestre* (L.) R. Br. English Pepper-grass or Field Cress. Fig. 1975.

Thlaspi campestre L. Sp. Pl. 646. 1753.

Lepidium campestre R. Br. in Ait. f. Hort. Kew. 4: 88. 1812.

Annual or biennial, hoary-pubescent with scale-like hairs, the stems erect, 2–5 dm. high, leafy up to the inflorescence. Basal leaves 5–7 cm. long, oblong or spatulate-oblong, entire or pinnatifid, long-petioled; stem leaves entire or slightly dentate, auriculate-clasping; racemes elongated and dense; pedicels spreading, 4–8 mm. long; petals white or yellowish; pods ovate, 5 mm. long, broadly winged at the apex, rough, narrowly notched; style minute.

In fields and waste places, naturalized from Europe; infrequent in the Pacific States, but becoming well established in some localities, especially in eastern Oregon and Lake Tahoe region, California. May–July.

6. *Lepidium montanum* Nutt. Mountain Pepper-grass. Fig. 1976.

Lepidium montanum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 116. 1838.

Perennial, more or less puberulent or hirsutulous, the stems often several from the same root, 2–4 dm. high. Basal leaves 2-pinnatifid with oblong or obovate segments, the upper pinnatifid or lobed, rarely entire; racemes dense; pedicels 5–6 mm. long; petals 2 mm. long, clawed; pod broadly ovate, 2 mm. long, narrowly winged, obscurely notched at the apex; style scarcely 1 mm. long.

Mountain valleys and plains, Arid Transition Zone; eastern Oregon to Wyoming, south, east of the Sierra Nevada, to Mono County, California, Nevada, Arizona, and New Mexico, also northern Mexico. Type locality: "Plains of the Rocky Mountains on western side, to the borders of the Oregon." April–June.

Hitchcock (Madroño 3: 304. 1936) refers our plants to variety *L. montanum* var. *canescens* (Thell.) C. L. Hitchcock.

7. *Lepidium Jonesii* Rydb. Jones' Pepper-grass. Fig. 1977.

Lepidium Jonesii Rydb. Bull. Torrey Club 29: 233. 1902.

Lepidium alyssoides var. *Jonesii* Thell. Denks. Schweiz. Gesell. Naturwiss. 41, abh. 1: 208. 1906.

Lepidium montanum var. *Jonesii* C. L. Hitchcock, Madroño 3: 309. 1936.

Perennial, glabrous or minutely puberulent, the stems usually several, erect, corymbosely branched above, leafy. Lower leaves pinnatifid with oblong-acute segments; upper leaves 1.5–50



1964



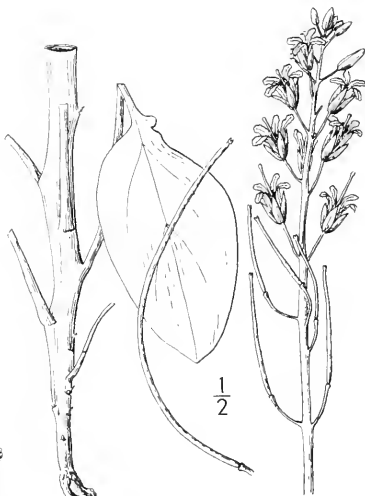
1965



1966



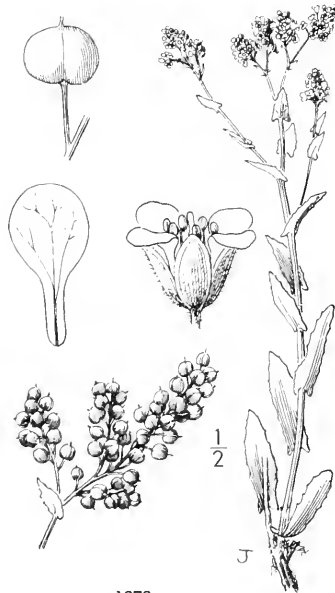
1968



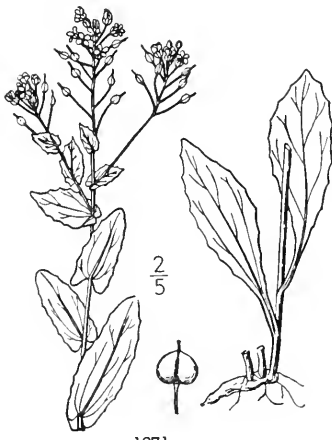
1967



1969



1970



1971



1972

1964. *Caulanthus major*
1965. *Caulanthus Hallii*
1966. *Caulanthus crassicaulis*

1967. *Caulanthus glaucus*
1968. *Caulanthus pilosus*
1969. *Subularia aquatica*

1970. *Hymenophyssa pubescens*
1971. *Lepidium Draba*
1972. *Lepidium Jaredii*

mm. long, oblong-lanceolate, entire or few-lobed, acute; racemes many-flowered; pedicels about 5-7 mm. long; sepals early deciduous, 1 mm. long, elliptic; petals more persistent, slender-clawed, white, 4 mm. long; pods elliptic-ovate, 3-4 mm. long, notched and narrowly winged at the apex.

Plains and river valleys, Sonoran Zones; eastern Mojave Desert, California, to Nevada and Utah. Type locality: "St. George, Utah." April-July.

8. *Lepidium Fremontii* S. Wats. Fremont's Pepper-grass. Fig. 1978.

Lepidium Fremontii S. Wats. Bot. King Expl. 30. pl. 4. f. 3, 4. 1871.

Nasturtium Fremontii Kuntze, Rev. Gen. Pl. 2: 937. 1891.

Suffrutescent, glabrous and glaucous, the stems woody below forming a low rounded evergreen bush 2-6 dm. high. Leaves 2.5-6 cm. long, narrowly linear, entire or with 1 or 2 pairs of narrow acute lobes or teeth; racemes numerous; pedicels slender, spreading; petals white, 3-4 mm. long; pods 5-8 mm. broad, thin and light colored, shallowly obcordate, with broad rounded lobes, usually tapering at base.

Arid gravelly or rocky slopes, Lower Sonoran Zone; Mojave Desert, California, to Utah, south to northern Lower California and Arizona. Type locality: Mojave River, California. March-June.

9. *Lepidium virginicum* L. Wild Pepper-grass. Fig. 1979.

Lepidium virginicum L. Sp. Pl. 645. 1753.

Annual, the stems erect, usually simple below, branching above, 15-50 cm. high, glabrous or minutely puberulent. Basal leaves obovate, somewhat lyrate pinnatifid; stem leaves sharply toothed or entire, the uppermost sessile; racemes glabrous; pedicels slender, spreading, 4-5 mm. long; petals about equaling the sepals, sometimes wanting in the later flowers; pods suborbicular, about 2 mm. broad; cotyledons accumbent.

Widely distributed through eastern North America. Rare in the Pacific States. Type locality: "In Virginia." May-Nov.

10. *Lepidium Menziesii* DC. Menzies' Pepper-grass. Fig. 1980.

Lepidium Menziesii DC. Syst. 2: 539. 1821.

Lepidium occidentale Howell, Erythea 3: 32. 1895.

Biennial from an elongated taproot, more or less puberulent or pubescent, the stems erect or decumbent, branching above the base. Lower leaves pinnately parted, the segments toothed or entire; upper leaves incisely dentate to entire; pedicels nearly terete, slender, spreading, exceeding the pods; petals present; stamens 2 or 4; pods lenticular, emarginate, about 3 mm. long, glabrous.

Cliffs along the coast, Boreal Zones; Vancouver Island to the coast of Oregon. Type locality: "In ora occidentali Americae borealis." June-Aug.

11. *Lepidium texanum* Buckl. Texas Pepper-grass. Fig. 1981.

Lepidium texanum Buckl. Proc. Acad. Phila. 1861: 449. 1862.

Lepidium intermedium A. Gray, Smiths. Contr. 5: 15. 1853. Not A. Rich. 1847.

Lepidium medium Greene, Erythea 3: 36. 1895.

Annual, the stems erect, 3-5 dm. high, branched above, glabrous or nearly so. Lower leaves obovate or oblanceolate, coarsely toothed, somewhat pubescent; upper leaves linear, mostly entire, glabrous; racemes open in fruit; pedicels 4-6 mm. long; petals white, about 1.5 mm. long; stamens mostly 2; pods orbicular, 3 mm. in diameter, narrowly wing-margined; style obsolete.

Sandy soil, Sonoran Zones; British Columbia to California, Missouri, Alabama, and Mexico. Type locality: Fort Mason, Texas. May-Oct.

12. *Lepidium idahoense* Heller. Idaho Pepper-grass. Fig. 1982.

Lepidium idahoense Heller, Bull. Torrey Club 26: 312. 1899.

Annual with erect stems, 20-50 cm. high, corymbosely branching above, sparingly and minutely puberulent. Lower leaves obovate-oblong, laciniately dentate, the upper sessile, entire or nearly so; racemes glabrous; pedicels slender, 4 mm. long, spreading; petals obovate, 2 mm. long; pods suborbicular, 2 mm. broad, glabrous.

Open, dry ridges, mainly Transition Zone; Washington and Idaho to southern California. Type locality: "Right bank of Snake River, near Lewiston," Idaho. April-June.

13. *Lepidium densiflorum* Schrad. Common Pepper-grass. Fig. 1983.

Lepidium densiflorum Schrad. Ind. Sem. Hort. Gotting. 4. 1832.

Annual, the stems erect, simple below, corymbosely branched above, 2-5 dm. high, glabrate or sparsely puberulent. Lower leaves irregularly toothed, the uppermost entire; racemes glabrous; pedicels mostly ascending, slender, 3-4 mm. long; petals none or rudimentary and much shorter than the sepals; pods suborbicular, about 2 mm. broad, glabrous.

This species has long been recognized as distinct from *L. virginicum* L., but erroneously referred to *L. apetalum* Willd. or *L. intermedium* A. Rich.

Widely distributed over North America and common in the Pacific States. Adventive in Europe where it was originally described. May-Aug.

Lepidium densiflorum var. *pubescarpum* (A. Nels.) Thell. Bull. Herb. Boiss. II. 4: 705. 1904. Annual, with the general habit of *L. densiflorum*, but usually lower and more branched and more puberulent. Distinguished chiefly by the pubescent pods. Dry plains and ridges, Upper Sonoran and Transition Zones; Rocky Mountain and Great Basin regions, from Montana to Texas and New Mexico, extending westward to eastern Washington and eastern Oregon.

14. *Lepidium lasiocarpum* Nutt. Hairy-pod Pepper-grass. Fig. 1984.

Lepidium lasiocarpum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 115. 1838.

Lepidium ruderales var. *lasiocarpum* Engelm. in A. Gray, Smiths. Contr. 5: 15. 1853.

Lepidium georginum Rydb. Bull. Torrey Club 30: 253. 1903.

Annual, hirsute throughout, the stems branching from the base, decumbent, 10–25 cm. long. Lower leaves incised or pinnately parted, the segments usually broad, obtuse or rounded, entire or sparingly toothed, the upper merely toothed; racemes numerous; pedicels strongly flattened, horizontally spreading, 3 mm. long; sepals broadly oblong, purple with a thin white margin; petals minute or none; pods suborbicular, 3 mm. long, thin-margined near the summit, hispid-pubescent on both faces, rarely glabrous.

Sandy soils, Sonoran Zones; coastal and desert regions of southern California to Colorado, Texas, and northern Mexico. Type locality: near Santa Barbara, California. March–June.

15. *Lepidium nitidum* Nutt. Shining Pepper-grass. Fig. 1985.

Lepidium nitidum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 116. 1838.

Lepidium nitidum var. *insigne* Greene, Fl. Fran. 274. 1891.

Annual, glabrous or sparingly pubescent, the stems erect or somewhat spreading, 5–30 cm. high, branching from near the base, the branches mostly simple. Lower leaves deeply pinnatifid, with attenuate segments, the upper often entire; racemes one to several; pedicels strongly flattened, rather loosely flowered; petals white, exceeding the sepals; pods suborbicular, 3–4 mm. long, narrowly thin-margined, abruptly notched at the apex, smooth and shining, convex on the lower surface, nearly flat or concave on the upper, often purple.

Grassy hills, valleys and plains, Upper Sonoran Zone; very common in California, and extending from Washington to Lower California. Type locality: near Santa Barbara, California. Feb–May.

Lepidium nitidum var. *Howellii* C. L. Hitchcock, Madroño 3: 293. 1936. Stems densely short-pubescent; pods usually with minute-pubescent margins. Western portion of Mojave Desert, California. Type locality: near Mojave.

16. *Lepidium bipinnatifidum* Desv. Wayside Pepper-grass. Fig. 1986.

Lepidium bipinnatifidum Desv. Journ. Bot. 3: 165. 1814.

Lepidium Menziesii Brewer & Wats. Bot. Calif. 1: 46. 1876. Not DC.

Puberulent or glabrate annual, the stems leafy, much branched from the base, decumbent or prostrate, often closely matting the ground. Leaves pinnatifid or the lowest bipinnatifid; racemes numerous, dense, rather short and narrow; petals none; pedicels flattened, 1–2 mm. long, ascending; pods orbicular, 2–5 mm. in diameter, glabrous, faintly reticulated, the teeth short and obtuse.

In hard beaten soil of waysides, naturalized from South America; rather common in California, less so in Oregon and Washington. Jan.–June.

17. *Lepidium latipes* Hook. Dwarf Pepper-grass. Fig. 1987.

Lepidium latipes Hook. Ic. Pl. 1: pl. 41. 1837.

Annual, pubescent or somewhat hirsute, the stems stout, branched from the base, procumbent or erect, 3–7 cm. long. Leaves 5–10 cm. long, linear, entire or with a few linear segments; racemes very dense, 15–40 mm. long; pedicels strongly flattened; petals greenish, 2 mm. long, exceeding the sepals; pods broadly oval, 5–6 mm. long, strongly reticulated, glabrous or sparingly pubescent, winged at the apex, with two broad erect teeth nearly as long as the body, the sinus between the teeth very narrow.

Alkaline flats, or balsas, Sonoran Zones; California, from the Sacramento Valley and North Coast Range valleys, to San Diego County. Type locality: Monterey, California. March–June.

18. *Lepidium dictyotum* A. Gray. Alkali Pepper-grass. Fig. 1988.

Lepidium dictyotum A. Gray, Proc. Amer. Acad. 7: 329. 1867.

Annual, pubescent or hirsutulous, the stems branching from the base, decumbent or at length ascending, 5–20 cm. long. Leaves narrowly linear, tapering at both ends, 20–25 mm. long, 2–4 mm. wide, entire or with a few narrow segments or teeth near the middle; racemes rather dense; pedicels flattened, ascending; petals usually none, when present little exceeding the sepals, white; pods elliptic-ovate, 3–4 mm. long, finely reticulate, pubescent or glabrous, with short obtuse wings or teeth at the summit, the sinus narrow.

Alkaline soils, Sonoran Zones; Washington and Idaho to southern California. Type locality: Steamboat Springs, Nevada. March–June.

19. *Lepidium oxycarpum* Torr. & Gray. Sharp-podded Pepper-grass. Fig. 1989.

Lepidium oxycarpum Torr. & Gray, Fl. N. Amer. 1: 116. 1838.

Lepidium oxycarpum var. *strictum* S. Wats. Bot. Calif. 1: 46. 1876.

Annual, hirsutulous, the stems very slender, branched from the base, the branches 10–15 cm. long, erect or ascending, floriferous more than half their length. Leaves linear, entire or with a few linear acute segments; pedicels very slender, flattened, widely spreading; sepals very unequal, early deciduous; petals none; stamens 2; pods suborbicular, 2.5 mm. long, glabrate, finely reticulate, tipped with 2 very short acute widely divergent teeth.

Border of salt marshes, or in alkaline soils, Sonoran Zones; San Francisco Bay region, California. Type locality: first collected by Douglas, somewhere in the coastal region of California. March–May.

20. *Lepidium acutidens* (A. Gray) Howell. Sharp-toothed
Pepper-grass. Fig. 1990.

Lepidium dictyotum var. *acutidens* A. Gray. Proc. Amer. Acad. 12: 54. 1876.

Lepidium oregonum Howell ex Greene, Fl. Fran. 274, in part. 1891.

Lepidium acutidens Howell, Fl. N.W. Amer. 1: 64. 1897.

Lepidium oxycarpum var. *acutidens* Jepson, Man. Fl. Pl. Calif. 441. 1925.

Annual, pubescent throughout with short spreading hairs, the stems branching from the base, decumbent or ascending, 10–20 cm. long. Leaves linear, tapering at both ends, entire or faintly and remotely denticulate, 2–5 cm. long, about 2 mm. wide; racemes loose, occupying about two-thirds of the branch; pedicels strongly flattened, appressed to the stem to near the middle, then curving outward; pod sparingly pubescent or glabrous, strongly reticulate, 4 mm. long including the prominent divergent acute teeth, the sinus between the teeth about 1 mm. deep and 2 mm. wide at the apex.

Saline or alkaline places, Sonoran Zones; eastern Oregon to southern California. Type locality: Yreka, California. March–July.

11. *CORONÒPUS* Gaertn. Fruct. 2: 293. 1791.

Diffuse ill-scented annual or biennial herbs, pubescent with simple hairs. Leaves usually pinnatifid. Flowers small, white. Stamens 2 or 4. Style very short. Silicles small, didymous, compressed contrary to the partition, sessile; valves oblong or subglobose, rugose or tuberculate, falling away from the septum at maturity as closed or nearly closed nutlets. Seeds 1 in each cell; cotyledons narrow, incumbent. [The ancient Latin name.]

About 6 species, of wide distribution in tropical and temperate regions. Type species, *Cochlearia Coronopus* L.

1. *Coronopus didymus* (L.) J. E. Smith. Lesser Wart-cress. Fig. 1991.

Lepidium didymum L. Mant. 92. 1767.

Coronopus didymus J. E. Smith, Fl. Brit. 3: 691. 1800.

Senebiera didyma Pers. Syn. Pl. 2: 185. 1807.

Carara didyma Britt. in Britt. & Brown, Ill. Fl. ed. 2. 2: 167. 1913.

Stems tufted, spreading, sparingly pubescent, 5–40 cm. long. Leaves deeply 1–2-pinnatifid, the lower slender-petioled, the upper sessile; flowers minute, white, racemose; pedicels slender, 2–3 mm. long in fruit; pod about 2 mm. broad; valves rugose, separating into ovoid nutlets.

In waste places, British Columbia to California, and across the continent; introduced from Europe. April–June.

12. *THLÁSPI* [Tourn.] L. Sp. Pl. 645. 1753.

Erect glabrous annual or perennial herbs, with the basal leaves forming a rosette, entire or toothed, the stem leaves auriculate and clasping. Flowers racemose, white or purple. Pods cuneate or orbicular, mostly emarginate, flattened contrary to the partition, crested or winged; valves dehiscent. Seeds 2 or several in each cell; cotyledons accumbent. [Greek, meaning to flatten, from the flat pod.]

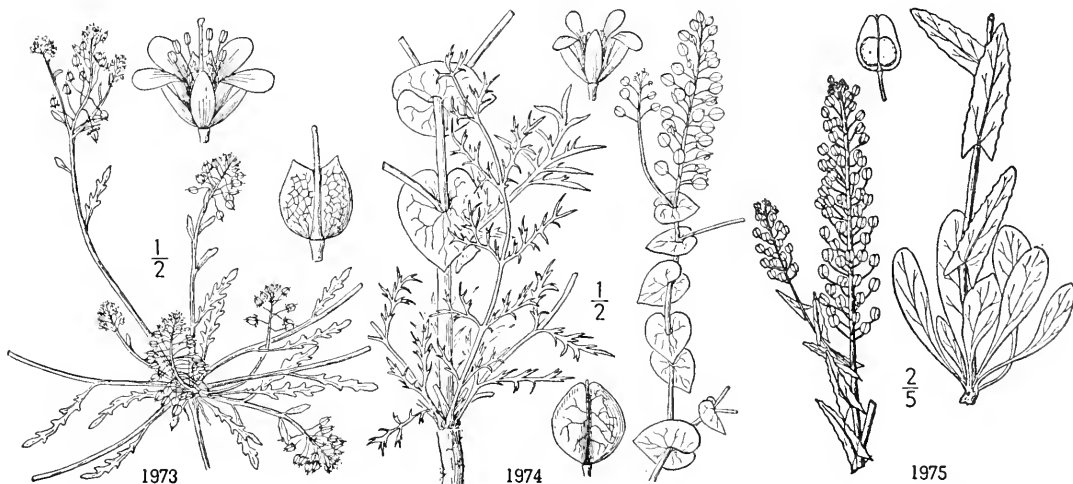
About 25 species, natives of the arctic and temperate zones. Type species, *Thlaspi arvense* L.

Annual, introduced; pod suborbicular, broadly winged and deeply notched.

Perennial; pod cuneate, obscurely winged and shallowly or not at all notched.

1. *T. arvense*.

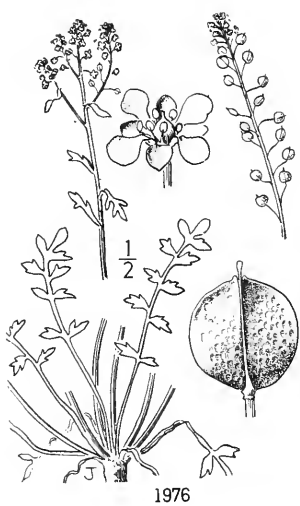
2. *T. alpestre*.



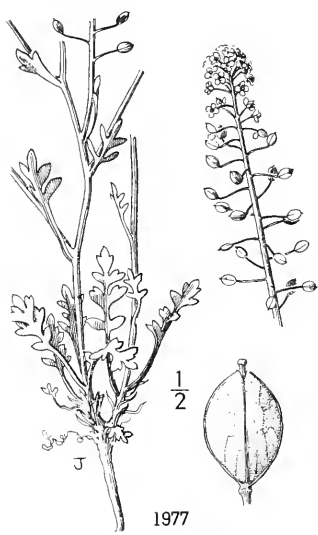
1973. *Lepidium flavum*

1974. *Lepidium perfoliatum*

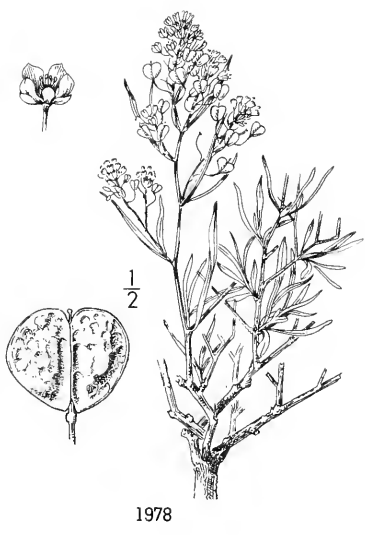
1975. *Lepidium campestre*



1976



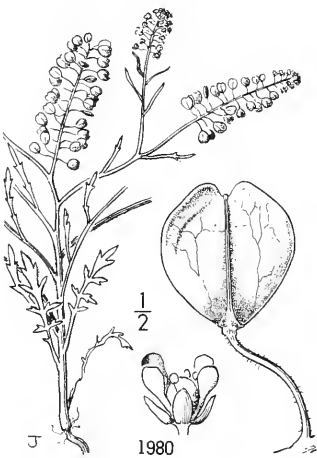
1977



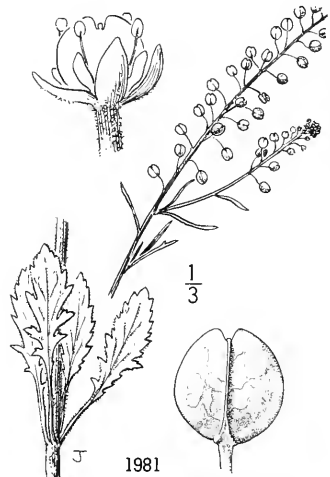
1978



1979



1980



1981



1982



1983

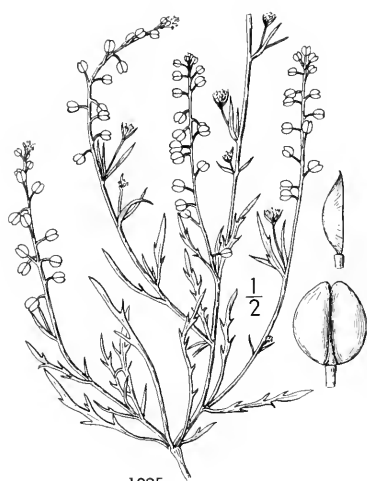


1984

1976. *Lepidium montanum*
1977. *Lepidium Jonesii*
1978. *Lepidium Fremontii*

1979. *Lepidium virginicum*
1980. *Lepidium Menziesii*
1981. *Lepidium texanum*

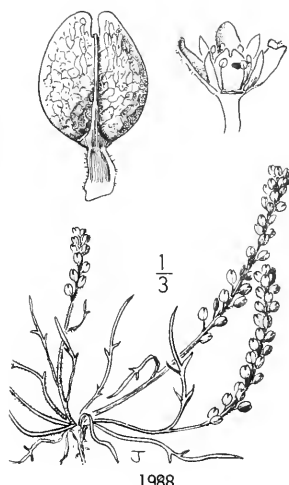
1982. *Lepidium idahoense*
1983. *Lepidium densiflorum*
1984. *Lepidium lasiocarpum*



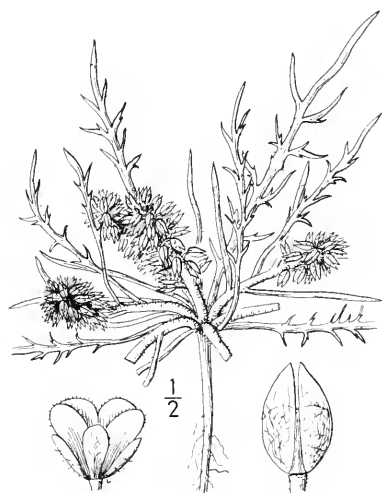
1985



1986



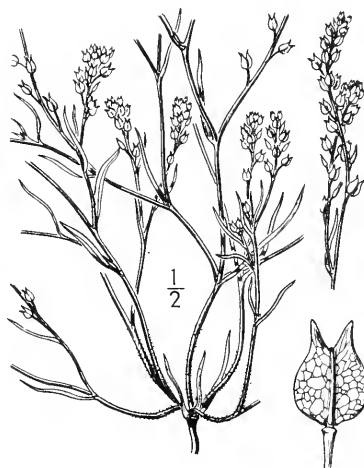
1988



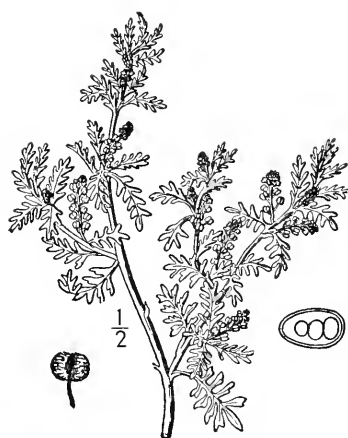
1987



1989



1990



1991



1992



1993

1985. *Lepidium nitidum*1986. *Lepidium bipinnatifidum*1987. *Lepidium latipes*1988. *Lepidium dictyotum*1989. *Lepidium oxycarpum*1990. *Lepidium acutidens*1991. *Coronopus didymus*1992. *Thlaspi arvense*1993. *Thlaspi alpestre*

1. *Thlaspi arvense* L. Field Penny Cress. Fig. 1992.

Thlaspi arvense L. Sp. Pl. 646. 1753.

Annual, glabrous, the stems erect, 2-5 dm. high, branching above. Basal leaves oblanceolate, petioled; stem leaves oblong to lanceolate, the lower sessile, the upper auriculate-clasping, sparingly toothed; pedicels spreading, slender; flowers white, 2-3 mm. high; pods suborbicular, 8-12 mm. broad, broadly winged all around; style obsolete or nearly so; seeds rugose.

Sparingly introduced along the coast in the Pacific States. Native of Eurasia. June-Aug.

2. *Thlaspi alpestre* L. Alpine Penny Cress. Fig. 1993.

Thlaspi alpestre L. Sp. Pl. ed. 2. 903. 1762.

Perennial, glabrous, the flowering stems one to several from the short simple or branched caudex, 1-3 dm. high. Basal leaves narrowly to broadly spatulate, 1-4 cm. long, entire or somewhat toothed; stem leaves few, auriculate-clasping, oblong to round-ovate; pedicels slender, spreading; sepals white-margined; petals 4-6 mm. long; pods 4-7 mm. long, cuneate, obtuse at apex or more commonly truncate, rather broadly retuse and narrowly winged; style 3 mm. long; seeds faintly reticulate.

Rocky situations, Transition and Canadian Zones; Washington and Montana, south to northern California, New Mexico, and Arizona. Also in Eurasia. Type locality: Austria. June-Aug.

This is a variable species but satisfactory specific characters are not evident for the recognition of more than one species. *Thlaspi californicum* S. Wats. (Proc. Amer. Acad. 17: 365. 1882) which was based upon specimens collected at Kneeland Prairie, Humboldt County, California, differs in having the pods acute or acutish at apex, but complete transitions from this form to the truncate and retuse pods are common. *Thlaspi glaucum* A. Nels. (Bull. Torrey Club 25: 275. 1898) extends westward through the Great Basin region to eastern Washington, Oregon, and northeastern California, but there seems to be no well-defined specific character for its segregation.

13. *COCHLEARIA* [Tourn.] L. Sp. Pl. 647. 1753.

Annual or biennial fleshy maritime herbs, with lobed or entire alternate leaves, and small, white, rarely purplish or yellowish racemose flowers. Sepals short and broad. Petals obovate. Style slender; stigma entire or nearly so. Silicle inflated, ovoid or spherical; valves very convex, dehiscent. Seeds several in each cell, in 2 rows, marginless; cotyledons mainly accumbent. [Greek, meaning spoon, from the shape of the leaves.]

About 25 species, natives of colder parts of the north temperate zone. Type species, *Cochlearia officinalis* L.

1. *Cochlearia officinalis* L. Spoonwort. Fig. 1994.

Cochlearia officinalis L. Sp. Pl. 647. 1753.

Cochlearia oblongifolia DC. Syst. 2: 363. 1821.

Succulent herb, with decumbent branches, stems 15-30 cm. long. Basal leaves long-petioled, oblong to reniform, obtuse, 15-25 mm. long, dentate or entire; upper leaves oblong to ovate, sessile or short-petioled; racemes elongated in fruit; pedicels 6-8 mm. long; petals white, 2-3 mm. long; pods 4-6 mm. long, smooth or reticulated; valves strongly 1-nerved.

Along the seacoast, Boreal Zones; generally distributed over arctic North America, Europe, and Asia. On the Pacific Coast extending from Alaska to Oregon. A valued antiscorbutic salad in the far North. Type locality: in Europe. May-July.

14. *SISYMBRIUM* L. Sp. Pl. 657. 1753.

Annual or biennial herbs, with alternate dentate or pinnatifid leaves and yellow or white flowers. Pubescence when present of simple hairs. Sepals spreading. Stamens 6. Pods narrowly linear, elongated, terete or nearly so, appressed or divergent, the valves dehiscent. Stigma 2-lobed. Seeds in 1 or 2 rows in each cell, oblong, not winged; cotyledons incumbent. [Ancient Greek name of some crucifer.]

A genus of about 75 species, natives of the temperate regions of the world. Type species, *Sisymbrium altissimum* L.

Siliques erect, sharply acuminate.

1. *S. officinale*.

Siliques spreading, not acuminate.

Pedicels of the siliques stout.

Upper leaves pinnatifid with linear divisions; pods 1 mm. wide.

2. *S. altissimum*.

Upper leaves hastate or entire; pods 2 mm. wide.

3. *S. orientale*.

Pedicels of the siliques slender; upper leaves coarsely pinnatifid.

4. *S. Irio*.

1. *Sisymbrium officinale* (L.) Scop. Hedge Mustard. Fig. 1995.

Erysimum officinale L. Sp. Pl. 660. 1753.

Sisymbrium officinale Scop. Fl. Carn. ed. 2. 2: 26. 1772.

Sisymbrium leiocarpum Jordan, Diag. 1: 139. 1864.

Stems erect, 3-6 dm. high, more or less pubescent with simple hairs or glabrous. Basal leaves lyrate and somewhat runcinately pinnatifid, 7-15 cm. long, the upper shorter, lanceolate, subentire or hastate; pedicels 2 mm. long, erect in fruit; petals yellow, 3 mm. long; pods 10-15 mm. long, linear, acuminate, erect and closely appressed to the stem in fruit; valves strongly 1-nerved.

A common wayside weed, naturalized from Europe. April-Aug.

2. *Sisymbrium altissimum* (L.) Britt. Tumble Mustard. Fig. 1996.

Sisymbrium altissimum L. Sp. Pl. 659. 1753.

Norta altissima Britt. in Britt. & Brown, Ill. Fl. ed. 2: 2: 174. 1913.

Stems erect, widely branching, 6–12 dm. high, glabrous or nearly so. Lower leaves petioled, runcinate-pinnatifid, the lobes lanceolate, often auriculate; the upper smaller, often nearly sessile, deeply pinnatifid into narrowly linear divisions; pedicels thick, spreading, 6–8 mm. long; petals 6–8 mm. long; siliques very narrowly linear, stiff, 7–10 cm. long, 1 mm. thick, divergent; valves prominently 1-ribbed.

In waste places, naturalized from Europe; Washington to southern California. Becoming a troublesome weed in eastern Washington and Oregon where it is locally known as Jim Hill Mustard. May–July.

3. *Sisymbrium orientale* L. Oriental *Sisymbrium*. Fig. 1997.

Sisymbrium orientale L. Cent. Pl. 2: 24. 1756; Amoen. Acad. 4: 322. 1759.

Erect annual herb, the stems branched with ascending branches, 2–5 dm. high, hirsute-pubescent. Leaves pinnate or the upper pinnatifid, petioled, 2–5 cm. long, the terminal lobe hastate, linear-lanceolate to ovate, lateral lobes or leaflets 1–3 pairs, or on the upper leaves absent; sepals 4 mm. long; petals 6, yellow; fruiting racemes 8–20 cm. long; pedicels 3–10 mm. long, stout; pods ascending, 4–6 cm. long, 1–1.5 mm. wide, straight, glabrous or nearly so.

Native of the Old World, becoming well established in coastal California; San Francisco, Monterey, and San Diego Counties. May.

4. *Sisymbrium Irio* L. Desert Mustard. Fig. 1998.

Sisymbrium Irio L. Sp. Pl. 659. 1753.

Norta Irio Britt. in Britt. & Brown, Ill. Fl. 2: 174. 1913.

Annual herbs with erect stems 1–6 dm. high, mostly branching above the base, glabrous throughout except for occasional villous hairs. Lower and upper leaves petioled, runcinately 2–4-parted with the terminal lobe larger than the lateral ones; inflorescence many-flowered, flowers cream-colored; pedicels slender, spreading, 5–7 mm. long; siliques ascending, narrowly linear, flexible, 2–3.5 cm. long, less than 1 mm. wide.

Introduced weed, central southern California eastward through the desert area into Arizona and Sonora, Mexico. Type locality: European. Feb.–April.

15. ARABIDOPSIS (DC.) Schur. Enum. Pl. Trans. 55. 1866.

Annual or perennial herbs, with erect slender stems, pubescence of forked hairs. Leaves simple, entire or toothed. Flowers small, white or pink, in terminal racemes. Style very short; stigma 2-lobed. Pod terete; valves rounded, faintly nerved or nerveless, dehiscent. Seeds in 1 row in each cell, or in some European species in 2 rows; cotyledons incumbent. [Name from the resemblance of this genus to *Arabis*.]

About 12 species, natives of the northern hemisphere. Type species, *Arabis Thaliana* L.

1. *Arabidopsis Thaliana* (L.) Britt. Mouse-ear, Thale-cress. Fig. 1999.

Arabis Thaliana L. Sp. Pl. 665. 1753.

Sisymbrium Thalianum A. Gray, Ann. Sci. Nat. 7: 399. 1826.

Arabidopsis Thaliana Britt. in Britt. & Brown, Ill. Fl. ed. 2: 2: 176. 1913.

Annual, stem slender, erect, 5–40 cm. high, branching, more or less pubescent with short stiff hairs. Basal leaves oblanceolate or oblong, narrowed to a petiole, entire or slightly toothed; upper leaves smaller, sessile; pedicels slender, spreading, 4–8 mm. long; flowers usually white, 3–4 mm. long, pods ascending, 10–15 mm. long.

Waste places, especially in dry ground, Oregon and Washington, naturalized from Europe. May–July.

16. HALIMOLOBUS Tausch, Flora 19: 410. 1836.

Biennial or perennial herbs, with erect stems, mostly pubescent with forked hairs. Basal leaves oblong, short-petiolate, the cauline amplexicaul or sessile and cuneate, usually toothed. Racemes leafless. Sepals erect, oblong, the interior pair saccate at base. Petals white or yellow, spatulate. Stamens 6, with filiform filaments. Ovary broadly cylindric; ovules 8 to many; style short, slender; stigma minute, depressed. Silique terete, on slender pedicels; valves 1-nerved. Seeds in 2 rows, minute and usually numerous. [Name Greek, meaning jumping and silique, applied to these plants on account of their resemblance to *Alyssum halimifolium* Willd.]

An American genus of 11 known species. Type species, *Halimolobus lasiolobus* (Link) O. E. Schulz.

1. *Halimolobus diffusus* (A. Gray) O. E. Schulz. Diffuse *Halimolobus*.

Fig. 2000.

Sisymbrium diffusum A. Gray, Pl. Wright. 1: 8. 1852.

Hesperis diffusa Kuntze, Rev. Gen. Pl. 2: 934. 1891.

Halimolobus diffusus O. E. Schulz, Pflanzenreich 4¹⁰⁶: 285. 1924.

Sisymbrium diffusum var. *Jaegeri* Munz, Bull. S. Calif. Acad. 31: 61. 1932.

Perennial with a short woody caudex, the flowering stems several, branching from the base,

4-5 dm. high, canescent with stellate hairs. Leaves 3-6 cm. long, lanceolate to oblanceolate, narrowed at base to a short winged petiole, subentire or usually coarsely dentate or lobed, stellate-canescens on both surfaces; racemes terminating the numerous branchlets; sepals oblong, 2.5 mm. long; petals 3 mm. long; fruiting pedicels 2-10 mm. long; pods ascending, terete, 12-16 mm. long, 0.5 mm. thick, irregularly torulose, with a slender elongated beak.

Rock crevices, Sonoran Zones; White and Coso Mountains, Inyo County, California, to western Texas and southern Arizona. Type locality: "Pass of the Limpia," Texas. June-Nov.

17. *DESCURAINIA Webb & Berthel. Phytogr. Canar. 1: 71. 1836.

Annual, biennial or sometimes perennial herbs with finely dissected or coarsely bipinnatifid leaves and pubescence of forked hairs often mixed with glandular hairs. Inflorescence racemose, flowers small, shades of yellow, sometimes tinged with rose. Petals clawed, obovate, obtuse. Sepals obtuse, erect. Stamens 6, sometimes longer than petals and sepals. Pistil cylindric; style short, thick; stigma simple, depressed-capitate. Fruiting pedicels slender; siliques cylindric or claviform, septum 1-3-nerved. Seeds in one or two rows, minute, oblong or ellipsoid, reticulate. [Name in honor of Francis Descurain, friend of Antoine and Bernard Jussieu.]

About 20 species occurring most abundantly in the cold and temperate regions of North and South America while a few species are found in Europe, Asia, and the island groups of West Africa. Type species, *Descurainia Sophia* (L.) Webb.

Upper as well as lower leaves 2-3-pinnate; siliques 15-30 mm. long, septum of silique with 2-3 longitudinal nerves.

Upper leaves pinnate, the divisions often incised; siliques mostly less than 15 mm. long (see *D. obtusa adenophora*), septum of silique with 1 longitudinal nerve.

Siliques linear.

Siliques with 2-28 seeds; seeds distinctly in one row; style conspicuous.

Siliques 7-15 mm. long, 8-28-seeded.

Siliques 3-6 mm. long (rarely 7), 2-6-seeded.

Siliques with 40-60 seeds; seeds in two rows sometimes appearing one from crowding; style obsolete or nearly so.

Siliques clavate; seeds in two rows; style obsolete or nearly so.

Siliques 5-12 mm. long; seeds 12-20.

Siliques 2-4 mm. long; seeds 2-4.

1. *D. Sophia*.

2. *D. Richardsonii viscosa*.

3. *D. californica*.

4. *D. obtusa adenophora*.

5. *D. pinnata californica*.

6. *D. paradoxa*.

1. *Descurainia Sophia* (L.) Webb. Flixweed, Tansy-mustard. Fig. 2001.

Sisymbrium Sophia L. Sp. Pl. 659. 1753.

Sisymbrium parviflorum Lam. Fl. Franc. 2: 519. 1778.

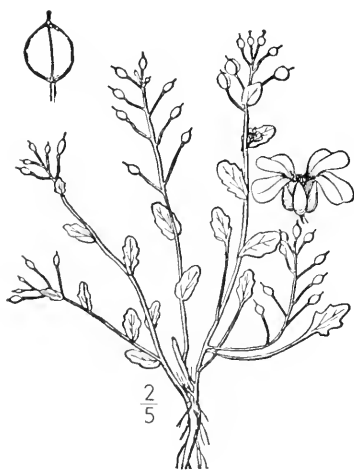
Descurainia Sophia Webb ex Prantl in Engler & Prantl, Pflanzenf. 3. abt. 2: 192. 1892.

Sophia Sophia Britt. in Britt. & Brown, Ill. Fl. 2: 144. 1897.

Sophia parviflora Standley, Contr. U.S. Nat. Herb. 22: 347. 1921.

Annual leafy herb branching above the base, 2.5-4 dm. high. Leaves hoary-canescens to green and glabrate, not glandular, twice or thrice pinnate into many narrowly linear to linear-oblong segments; flowers small, pale greenish yellow or yellowish white; sepals 2 mm. long; petals 1.5 mm. long; stamens surpassing all other floral parts; pedicels ascending, 9-11 mm.

*Text of the genus *Descurainia* contributed by Roxana Stinchfield Ferris.



1994

1994. *Cochlearia officinalis*



1995

1995. *Sisymbrium officinale*



1996

1996. *Sisymbrium altissimum*

long; siliques erect or merely ascending, mostly curved, 1.5–2.5 cm. long, less than 1 mm. broad, linear, acute at apex; septum 2- or sometimes 3-nerved; seeds in one row.

Introduced weed, more common in Canada, eastern Oregon, and Washington, and the Great Basin region, and occurring more sparingly in the eastern part of California as far south as San Diego County. Type locality: Europe. May–Aug.

2. *Descurainia Richardsonii* subsp. *viscosa* (Rydb.) Detling. Mountain Tansy-mustard. Fig. 2002.

Sophia viscosa Rydb. Bull. Torrey Club 29: 238. 1902.

Descurainia Rydbergii O. E. Schulz, Pflanzenreich 4105: 319, in part. 1924.

Descurainia Richardsonii subsp. *viscosa* Detling, Amer. Midl. Nat. 22: 492. 1939.

Annual herb 4–8 dm. high branching above the base, the branches ascending, more or less pubescent throughout. Leaves thin, 5–10 cm. long, bipinnate or the cauline pinnatifid or bipinnatifid, with broad lobes; inflorescence glandular; fruiting racemes often congested; pedicels 4–9 mm. long, ascending, or the lower ones divaricately spreading; flowers yellow; sepals 1.5–1.8 mm. long; petals slightly surpassing the sepals; siliques 8–15 mm. long, glabrous, ascending or sometimes erect, rarely divaricately spreading, on same axis as pedicel, acute at base and apex and tipped by style 0.5 mm. or more long; seeds dark, in one row, 1–1.3 mm. long.

Dry pine and fir forests, Canadian Zone; Cascade Mountains, Washington, south to the Sierra Nevada of California and east to the Rocky Mountains. Type locality: Beaver Canyon, Idaho. June–Sept.

Descurainia Richardsonii var. *macrospérma* O. E. Schulz, Pflanzenreich 4105: 319. 1924. Plants non-glandular, essentially glabrous; fruiting pedicels but slightly spreading and siliques closely appressed to the axis of the inflorescence. Central Rocky Mountain area and occasional in the Sierra Nevada, California. *Sophia proccra* Greene and *Sisymbrium Hartwegianum* of authors, not Fourn. are here considered synonyms of the variety.

Descurainia Richardsonii subsp. *incisa* (Engelm.) Detling, Amer. Midl. Nat. 22: 494. 1939. (*Sisymbrium incisum* Engelm. in A. Gray, Fl. Fendl. 8. 1849.) Plants more or less pubescent, non-glandular; fruiting pedicels spreading, siliques on same axis as the pedicel or ascending. At high elevations, southern Montana south to Chihuahua, Mexico, and through the Sierra Nevada and mountains of southern California to the Sierra San Pedro Martir, Lower California, Mexico.

3. *Descurainia californica* (A. Gray) O. E. Schulz. Sierra Tansy-mustard. Fig. 2003.

Smelowskia californica A. Gray, Proc. Amer. Acad. 6: 520. 1865.

Sophia Sonnei Greene, Pittonia 3: 95, as to description, not synonymy. 1896.

Sophia leptostylis Rydb. Bull. Torrey Club 39: 325. 1912.

Descurainia californica O. E. Schulz, Pflanzenreich 4105: 330, as to name only. 1924.

Annual herbs, 5–8 dm. high, the stems branching above the base, herbage green. Leaves thin, scantily pubescent, pinnate, the upper often pinnatifid with broad obtuse lobes; inflorescence compact, glabrous, flowers yellow, pedicels ascending, 2.5–5 mm. long; siliques ascending or erect, 3–5 mm. long, appressed to axis of inflorescence, acute at both ends, tipped by style 5 mm. or more long; seeds about 1 mm. long, in one row.

Arid Transition and Boreal Zones; the crest of the Sierra Nevada of California east to the southern mountain ranges of the Great Basin region and south to northern Arizona and New Mexico. Type locality: Mono Lake, California. July.

4. *Descurainia obtusa* subsp. *adenophora* (Woot. & Standl.) Detling. Desert Tansy-mustard. Fig. 2004.

Sisymbrium Cumingianum Robinson in A. Gray, Syn. Fl. N. Amer. 1: 139. 1895. Not Fisch. & Mey. 1835.

Sophia adenophora Woot. & Standl. Contr. U.S. Nat. Herb. 16: 127. 1913.

Descurainia obtusa subsp. *adenophora* Detling, Amer. Midl. Nat. 22: 498. 1939.

Coarse canescent-tomentose thick-leaved annual, 6–15 dm. high, branching above the base, the branches ascending. Lower cauline leaves 5–14 cm. long, coarsely bipinnatifid, the segments obtuse, the upper 2–5 cm. long, pinnate with lobes oblong to oblong-lanceolate; inflorescence many-flowered, glandular-pubescent throughout, petals pale yellow, slightly exceeding the sepals; pedicels spreading, nearly equaling the erect or ascending siliques; siliques slightly pubescent to glabrate, linear, acute, 12–19 mm. long; seeds less than 1 mm. long, obscurely arranged in 2 rows.

Upper Sonoran Zone; San Jacinto and San Bernardino Mountains of southern California, east to New Mexico. Type locality: northwestern Grant County, New Mexico. May–June.

5. *Descurainia pinnata* subsp. *Menziessii* (DC.) Detling. Western Tansy-mustard. Fig. 2005.

Cardamine Menziessii DC. Syst. 2: 267. 1821.

Sisymbrium canescens var. *californicum* Torr. & Gray, Fl. N. Amer. 1: 92. 1838.

Descurainia Menziessii O. E. Schulz, Pflanzenreich 4105: 328. 1924.

Descurainia pinnata subsp. *Menziessii* Detling, Amer. Midl. Nat. 22: 508. 1939.

Annual herbs, canescent throughout to nearly glabrate, 1–4 dm. high, simple or much branched from the base. Leaves bipinnate or bipinnatifid, divided into many elliptic or linear-oblong segments, 1–3 cm. long; inflorescence glandular to glabrate; flowers many, greenish yellow or nearly white, 2 mm. or less long; petals barely exceeding sepals; pedicels widely divergent, often at right angles to rachis, 8–15 mm. long; siliques usually curved, slightly ascend-

ing or horizontal, 6–8 mm. long, often 2 mm. wide, acute at base, obtuse at apex; style minute; seeds less than 1 mm. long, always in 2 rows.

Usually in sandy soil, Upper and Lower Sonoran Zones; Contra Costa County, California, to southern California, east to the Mojave and Colorado Deserts. Type locality: California. April–June.

Descurainia pinnata subsp. *halictorum* (Cockerell) Detling, Amer. Midl. Nat. 22: 505. 1939. (*Sophia halictorum* Cockerell, Bull. Torrey Club 25: 460. 1898.) Characterized by divergent and ascending pedicels rather than horizontal, pale yellow flowers, siliques shorter than those of the species, and terminal leaflets of the upper leaves usually elongated; seeds distinctly in 2 rows. Southeastern Oregon and Idaho and eastern slope of the Sierra Nevada, California, east to western Texas and Oklahoma.

Descurainia pinnata subsp. *glabra* (Woot. & Standl.) Detling, Amer. Midl. Nat. 22: 507. 1939. (*Sophia glabra* Woot. & Standl. Contr. U.S. Nat. Herb. 16: 127. 1913.) Inflorescence glabrous, flowers pale yellow, siliques shorter than the preceding subspecies (4–6 mm. long), terminal leaflets rounded not elongate, seeds distinctly in 2 rows. Most abundant form in the Sonoran Desert area.

Descurainia pinnata subsp. *intermedia* (Rydb.) Detling, Amer. Midl. Nat. 22: 511. 1939. (*Sophia intermedia* Rydb. Mem. N.Y. Bot. Gard. 1: 184. 1900.) Plants non-glandular, nearly glabrous; petals yellow, about 2 mm. long, pedicels spreading, shorter than the siliques, seeds more or less distinctly in 2 rows. Northeastern California and adjacent Nevada, and southern Montana to western Wyoming and Colorado.

Descurainia pinnata subsp. *Nelsonii* (Rydb.) Detling, Amer. Midl. Nat. 22: 512. 1939. (*Sophia Nelsonii* Rydb. Bull. Torrey Club 34: 436. 1907.) Plants non-glandular, nearly glabrous, petals yellow, about 1.5 mm. long; pedicels and siliques short, erect; seeds more or less distinctly in 2 rows. Eastern Oregon and Washington, east to Montana, Wyoming, and Colorado.

Descurainia pinnata subsp. *filipes* (A. Gray) Detling, Amer. Midl. Nat. 22: 513. 1939. (*Sisymbrium incisum* var. *filipes* A. Gray, Mem. Amer. Acad. II. 4: 8. 1849.) Plants non-glandular, nearly glabrous; petals yellow, 2 mm. long; pedicels longer than the siliques, the siliques spreading or erect. Eastern slopes of Cascade Mountains, Washington and Oregon, and south in the Sierra Nevada, California, to Yosemite Valley. Also in the northern Rocky Mountain region.

6. *Descurainia paradisæ* (A. Nels. & Kennedy) O. E. Schulz. Nevada Tansy-mustard. Fig. 2006.

Sophia paradisæ A. Nels. & Kennedy, Proc. Biol. Soc. Wash. 19: 155. 1906.

Descurainia paradisæ O. E. Schulz, Pflanzenreich 4105: 331. 1924.

Gray, canescent annual herbs, branching from the base, 1–2.5 dm. high. Leaves bipinnate or bipinnatifid into short, mostly linear-oblong lobes; inflorescence scantily pubescent, glandular; flowers whitish-yellow; pedicels 3–4 mm. long, ascending, sometimes curved; pods 1.5–3.5 mm. long, on same axis as pedicel or nearly erect, elliptic in outline, obtuse at the apex; style minute; seeds less than 1 mm. long, distinctly in 2 rows.

Upper Sonoran Zone; Great Basin region from southeastern Oregon to Inyo County, California. Type locality: Paradise Valley, Humboldt County, Nevada. Closely related to the preceding species complex. April–May.

18. *CAKÏLE* [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Fleshy glabrous branching annual herbs, with purple or white flowers. Style none. Pods sessile, flattened or ridged, indehiscent, 2-jointed, the joints 1-celled and 1-seeded, or the lower seedless, the upper deciduous when ripe, the lower persistent. Cotyledons accumbent. [Old Arabic name.]

A genus of 4 species, natives of sea and lake shores of north temperate and tropical regions. Type species, *Bunias Cakile* L.

Lower joint of silique with two slightly recurved horn-like protuberances at apex; leaves pinnatifid.
1. *C. maritima*.

Lower joint of silique without expanding horn-like processes; leaves merely sinuate-dentate.
2. *C. edentula californica*.

1. *Cakile marítima* Scop. Sea Rocket. Fig. 2007.

Bunias Cakile L. Sp. Pl. 670. 1753.

Cakile marítima Scop. Fl. Carn. ed. 2: 35. 1772.

Plants fleshy and glabrous, branching from the base, the branches procumbent or decumbent, often 4–5 dm. long. Leaves deeply pinnatifid, 4–8 cm. long, the lobes varying from 4–8, oblong or linear, 5–15 mm. long, rounded at apex; sepals 3 mm. long; petals rose-colored, 8–10 mm. long; fruiting racemes 20–35 cm. long; pedicels stout, about 2 mm. long; pods about 15 mm. long; the lower joint half the length of the upper, bearing 2 triangular protuberances at the apex, upper joint flattened, entire at the apex.

Beach sand; along the coast from Sonoma County to San Mateo County, California. Native of Europe and the Mediterranean region. June–Nov.

2. *Cakile edéntula* var. *califórnica* (Heller) Fernald. California Sea Rocket. Fig. 2008.

Cakile californica Heller, Muhlenbergia 3: 10. 1907.

Cakile edentula var. *californica* Fernald, Rhodora 24: 23. 1922.

Plants fleshy, the main stem stout, erect, branching from the base, the lower lateral branches often decumbent. Leaves 15–40 mm. long, oblanceolate, rounded or obtuse at the apex, narrowed to a stout petiole, sinuate-dentate; racemes becoming 1–2 dm. long in fruit; pedicels stout, 3–5 mm. long; sepals 3–4 mm. long; petals purple-tinged, 6 mm. long; pods 15 mm. long, upper joint broader than the lower, flattened and angled, narrowed to a stout retuse beak.

Beach sands; the typical species ranges from Labrador to Florida, the variety *lacustris* Fernald is confined to the Great Lakes, and the variety *californica* extends along the shores of the Pacific from British Columbia to southern California. May–Nov.

19. *ĪSATIS* L. Sp. Pl. 670. 1753.

Annual, biennial, or perennial herbs, with perfect racemose flowers. Sepals ascending, not gibbous at the base. Petals yellow. Stamens 6; filaments slender. Pod oval to oblong, flattened and winged all around, indehiscent, 1-celled, 1-seeded or rarely 2-seeded. Style none. Cotyledons incumbent. [The classical name.]

A genus of about 35 species, natives of Europe. Type species, *Isatis tinctoria* L.

1. *Isatis tinctoria* L. Dyer's Woad. Fig. 2009.

Isatis tinctoria L. Sp. Pl. 670. 1753.

Biennial or perennial, glaucous and glabrous, except for cilia on the midrib of the lower leaves; stems branching from near the base, 3–10 dm. high. Leaves blue-green, the lower oblanceolate, entire or denticulate, 7–10 cm. long, the upper sagittate-clasping; racemes several, usually in crowded corymbs; flowers small, about 3 mm. high; pods oblong, 12–15 mm. long, 5–7 mm. wide, pendent in age on slender pedicels.

A locally naturalized weed, native of Europe; Siskiyou County, California, and in Utah. Locally known in California as Marlahan Mustard. April–June.

20. *ERÛCA* [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Annual or biennial erect branching herbs with pinnately lobed or toothed leaves. Flowers racemose, variously colored, with brown or purple veins. Sepals erect. Style elongated. Siliques linear-oblong, turgid, long-beaked, the valves 3-nerved. Seeds many in 2 rows in each cell, globose. Cotyledons conduplicate. [Ancient Latin name of some member of the mustard family.]

About 5 species native of the Mediterranean region. Type species, *Brassica Eruca* L.

1. *Eruca sativa* Mill. Garden Rocket. Fig. 2010.

Brassica Eruca L. Sp. Pl. 667. 1753.

Eruca sativa Mill. Gard. Dict. ed. 8. no. 1. 1768.

Eruca Eruca Britt. in Britt. & Brown, Ill. Fl. ed. 2. 2: 192. 1913.

Erect, glabrous and somewhat succulent annual, 3–5 dm. high. Lower leaves pinnately lobed or pinnatifid, 7–15 cm. long, the upper lobed or dentate; flowers racemose, the racemes becoming much elongated in fruit; sepals 10–12 mm. long; petals 15–20 mm. long, variously colored, conspicuously purple-veined; pods erect on short stout upcurved pedicels, 15–25 mm. long, the valves keeled on the back, 4–5 mm. thick, the beak flattened, nearly as long as the body.

Waste ground and fields, especially alfalfa fields; eastern Washington, central and southern California; also introduced into Utah, New Mexico, eastern United States, and Mexico. Native of Europe. May–July.

21. *SINĀPIS* L. Sp. Pl. 668. 1753.

Annual or biennial, erect, branching, more or less hispid herbs, with pinnatifid or lobed leaves, and mostly rather showy yellow flowers in terminal racemes. Stamens 6. Pods nearly terete, sessile, constricted between the seeds, tipped with a very long flattened sword-like or angled beak, the valves 3-nerved. Seeds subglobose, in 1 row in each cell; cotyledons conduplicate. [Name Greek, ancient name for turnip.]

About 5 species, natives of southern Europe. Type species, *Sinapis alba* L.

Fruiting pedicels spreading, 8–12 mm. long; pods hairy.

1. *S. alba*.

Fruiting pedicels ascending, 4–6 mm. long; pods glabrous.

Pods stout, 3–4 mm. wide, not appressed; leaves sparsely hispid or glabrous.

2. *S. arvensis*.

Pods slender, 1 mm. wide, appressed; leaves canescent with a dense hirsute pubescence.

3. *S. incana*.

1. *Sinapis álba* L. White Charlock or Mustard. Fig. 2011.

Sinapis alba L. Sp. Pl. 668. 1753.

Brassica hirta Moench, Suppl. Meth. 84. 1802.

Brassica alba Rabenhorst, Fl. Lusatica 1: 184. 1839. Not Gilibert 1782.

Stems 3–7 dm. high, more or less hirsute with stiff spreading hairs. Lower leaves lyrate-pinnate or pinnatifid, 10–20 cm. long, the lobes dentate; uppermost leaves lanceolate or oblong, often merely dentate, short-petioled; petals yellow, about 1 cm. long; fruiting pedicels spreading; pod densely hispid, about 3 cm. long, spreading; beak sword-like, equaling or usually longer than the body of the pod.

In waste places and fields, occasionally escaped from cultivation in California; native of Europe and Asia. March–August.

2. *Sinapis arvénis* L. Field Charlock or Mustard. Fig. 2012.

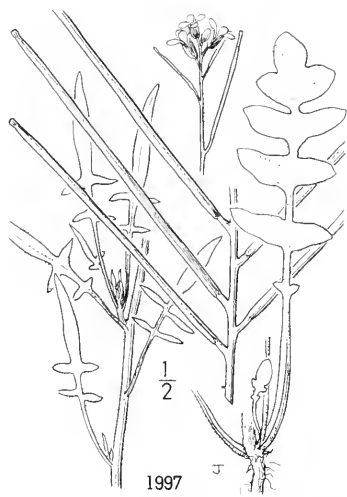
Sinapis arvensis L. Sp. Pl. 668. 1753.

Brassica sinapistrum Boiss. Voy. Espag. 2: 39. 1839–45.

Brassica arvensis Rabenhorst, Fl. Lusatica 1: 184. 1839. Not L. 1767.

Brassica kaber (DC.) L. C. Wheeler, Rhodora 40: 306. 1938.

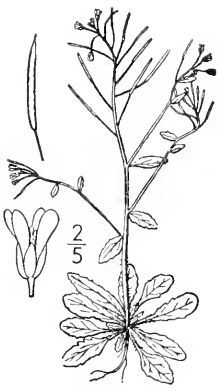
Stems 3–6 dm. high, branching above, hispid with scattered stiff hairs, or glabrate. Lower



1997



1998



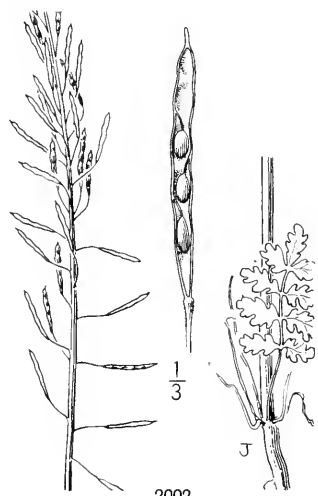
1999



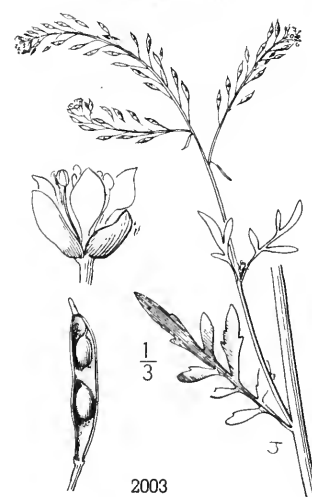
2000



2001



2002



2003



2004

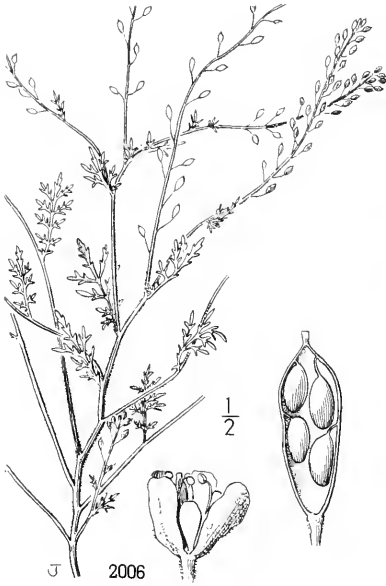


2005

1997. *Sisymbrium orientale*
1998. *Sisymbrium Irio*
1999. *Arabidopsis Thaliana*

2000. *Halimolobus diffusus*
2001. *Descurainia Sophia*
2002. *Descurainia Richardsonii*

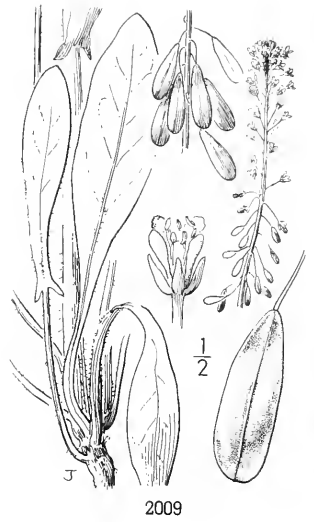
2003. *Descurainia californica*
2004. *Descurainia obtusa*
2005. *Descurainia pinnata*



2006



2007



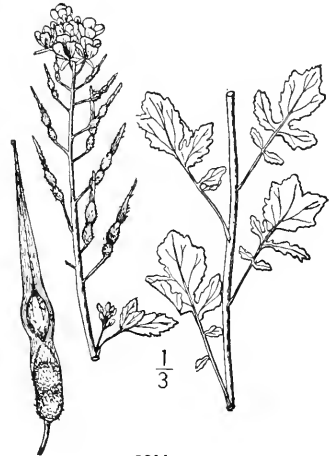
2009



2010



2008



2011



2012



2013



2014

2006. *Descurainia paradoxa*
 2007. *Cakile maritima*
 2008. *Cakile edentula*

2009. *Isatis tinctoria*
 2010. *Eruca sativa*
 2011. *Sinapis alba*

2012. *Sinapis arvensis*
 2013. *Sinapis incana*
 2014. *Brassica nigra*

leaves usually lyrate-pinnatifid, with a rounded toothed terminal lobe, usually hispid on the veins beneath; upper leaves oblong to lanceolate, merely toothed; petals yellow, 8 mm. long; pedicels ascending, about 5 mm. long; pods ascending, 3-4 cm. long; beak about 5 mm. long.

Fields and waste places, naturalized from Europe, and widespread in the Pacific States and the eastern United States. March-Oct.

3. *Sinapis incana* L. Mediterranean Mustard. Fig. 2013.

Sinapis incana L. Cent. Pl. 1: 19. 1755.

Hirschfeldia adpressa Moench, Meth. 264. 1794.

Sinapis geniculata Desf. Fl. Atlantica 2: 98. 1798.

Brassica adpressa Boiss. Voy. Espag. 2: 38. 1839.

Brassica incana Meigen, Deutsch. Fl. 3: 270. 1842. Not Tenore 1811-15.

Stems much branched from near the base, 4-6 dm. high. Leaves canescent with a dense hirsute pubescence, the basal lyrate-pinnatifid, 6-8 cm. long, those of the stems becoming much reduced and simple; racemes numerous, terminating the widely spreading branches; petals 5-6 mm. long; pods upwardly appressed, 8-12 mm. long, the beak usually much shorter than the body, flattened and usually containing a seed.

In dry fields and waste places; introduced into central and southern California, and becoming a common late spring and summer weed. Native of the Mediterranean region. May-Aug.

22. BRÁSSICA [Tourn.] L. Sp. Pl. 666. 1753.

Annual, biennial, or perennial herbs, with erect branching stems and alternate leaves, the basal pinnatifid, those of the stem toothed or entire. Flowers showy, yellow, in elongated racemes. Siliques elongated, terete or 4-sided, sessile, tipped with a conical beak; valves 1-3-nerved; stigma truncate or 2-lobed. Seeds in one row in each cell, subglobose, marginless; cotyledons conduplicate. [Latin name of the cabbage.]

A genus of about 80 species. Natives of Europe, Asia, and northern Africa. Type species, *Brassica oleracea* L.

Upper leaves not clasping, short-petioled.

Pods slender, 10-20 mm. long, appressed; pedicels 2 mm. long; lower leaves often hispid, their segments serrate.

Pods 25-50 mm. long, erect but not appressed; pedicels 3-5 mm. long; plant glabrous and glaucous throughout; segments of lower leaves crenate.

Upper leaves clasping by an auricled base.

1. *B. nigra*.

2. *B. juncea*.

3. *B. campestris*.

1. *Brassica nigra* (L.) Koch. Black Mustard. Fig. 2014.

Sinapis nigra L. Sp. Pl. 668. 1753.

Brassica nigra Koch in Roehl, Deutsch. Fl. ed. 3. 4: 713. 1833.

Annual, with erect freely branching stems, 6-25 dm. high, sparsely pubescent or glabrate. Lower leaves pinnatifid, with 1 terminal large lobe and 2-4 smaller lateral ones, dentate all around; upper leaves short-petioled or sessile, pinnatifid or dentate, the uppermost reduced, lanceolate and entire; petals bright yellow, spatulate, 7-8 mm. long; pod 15-20 mm. long, about 1 mm. thick, 4-sided, appressed against the stem; beak slender, 2-4 mm. long; seeds dark brown.

In fields and waste places, naturalized from Europe; common in the Pacific States, and widely spread throughout North America except in the extreme north. April-Sept.

2. *Brassica juncea* (L.) Cosson. Chinese or Indian Mustard. Fig. 2015.

Sinapis juncea L. Sp. Pl. 668. 1753.

Brassica juncea Cosson, Bull. Soc. Bot. Fr. 6: 609. 1859.

Annual with erect stout pale somewhat glaucous, glabrous or slightly pubescent stems, 3-12 dm. high. Lower leaves lyrate-pinnatifid and crenate, long-petioled, the uppermost reduced, sessile or nearly so, lanceolate or linear, mostly entire; petals yellow, 8-10 mm. long; pod 3-5 cm. long, 2-3 mm. thick, ascending, not appressed to the stem; beak 5-8 mm. long.

In fields and waste places; naturalized in the Pacific States from Washington and Oregon to southern California, but less common than *B. nigra*; also eastward to the Atlantic States. Native of Asia. June-Sept.

3. *Brassica campestris* L. Common Mustard. Fig. 2016.

Brassica campestris L. Sp. Pl. 666. 1753.

Biennial with a large fleshy taproot; stem 3-10 dm. high, branching, glabrous and glaucous, or slightly pubescent below. Basal leaves lyrate-pinnatifid, sparsely pubescent; upper leaves oblong to lanceolate, clasping the stem by an auriculate base, entire or dentate, glabrous; petals yellow, spatulate, 6-7 mm. long; pedicels spreading, 15-25 mm. long; pod 5-7 cm. long, about 3 mm. thick; beak about 1 cm. long.

In fields and waste places, naturalized from Europe; a common weed in the Pacific States. Jan.-June, or throughout the year in California.

Brassica Napus L. Sp. Pl. 666. 1753. Rape. Sometimes growing spontaneously in central and southern California. Resembles *B. campestris* L. but flowers paler and plant including the early leaves glabrous. *Brassica Rapa* L., the turnip, and *Brassica oleracea* L., the cabbage, also sometimes growing spontaneously in neglected fields.

Erucastrum gallicum (Willd.) O. E. Schulz, Bot. Jahrb. 54, Beibl. 119: 56. 1916. Branching annual with pinnatifid leaves, the lower flowers of the raceme in the axils of foliaceous bracts, in that respect as well as in the pinnatifid leaves suggesting *Tropidocarpum*. Pods linear, 2-3 cm. long, distinctly beaked. Locally introduced in Santa Clara County, California. Native of Europe.

23. *DIPLLOTÁXIS* DC. Syst. 2. 628. 1821.

Annual, biennial or perennial herbs with the general habit of the mustards. Leaves basal and cauline, alternate, pinnatifid or lobed. Flowers yellow, rather showy, in elongated terminal racemes. Pods elongated, linear, more or less flattened parallel with the partition, short-beaked or beakless; valves mostly 1-nerved, dehiscent. Seeds in two rows in each cell, marginless; cotyledons conduplicate. [Greek, referring to the double row of seeds.]

A genus of about 20 species, natives of the Mediterranean region and central Europe. Type species, *Diplotaxis tenuifolia* (L.) DC.

Perennial; stem leafy nearly to the inflorescence.

1. *D. tenuifolia*.

Annual; leaves mostly basal.

2. *D. muralis*.

1. *Diplotaxis tenuifolia* (L.) DC. Wall Rocket. Fig. 2017.

Sisymbrium tenuifolium L. Cent. Pl. 1: 18. 1755.

Diplotaxis tenuifolia DC. Syst. 2: 632. 1821.

Perennial, glabrous or sparingly hispid, somewhat glaucous; stems branched from the base, leafy, 3–12 dm. high. Leaves pinnatifid, thin, the lower 7–15 cm. long, the lobes mostly narrow; racemes loose and elongated in fruit; pedicels slender, 2–4 cm. long in fruit; petals 8–10 mm. long; pods nearly erect, 25–30 mm. long, 2 mm. wide.

Locally adventive in Oregon (Portland, Salem) and in the Sacramento Valley and southern California. March–June.

2. *Diplotaxis muralis* (L.) DC. Sand Rocket. Fig. 2018.

Sisymbrium murale L. Sp. Pl. 658. 1753.

Diplotaxis muralis DC. Syst. 2: 634. 1821.

Annual, branched from the base, sparingly hispid or glabrous, the stems leafy only below, 3–6 dm. high. Leaves oblanceolate in outline, pinnately lobed or pinnatifid, 5–10 cm. long, mostly slender-petioled; racemes elongated and loose in fruit; petals about 1 cm. long; pod erect, flat-tish, 2–3 cm. long, about 2 mm. wide; fruiting pedicels 8–15 mm. long.

An occasional adventive, especially in southern California; native of Europe. March–May.

24. *RÁPHANUS* [Tourn.] L. Sp. Pl. 669. 1753.

Erect or widely branching from the base, annual or biennial herbs, with lyrate leaves and showy flowers. Pods elongated, linear, fleshy or corky, constricted or continuous and spongy between the seeds, indehiscent, tapering above into the persistent slender style. Seeds globose; cotyledons conduplicate. [Name Greek, meaning quick-appearing, from its rapid germination.]

A genus of about 4 species, natives of Europe and temperate Asia. Type species, *Raphanus sativus* L.

Pods not longitudinally grooved; only slightly constricted between the 2 to several seeds; petals variable in color, but usually purple-veined.

1. *R. sativus*.

Pods longitudinally grooved, strongly constricted between the 4–10 seeds when dry; petals yellow.

2. *R. Raphanistrum*.

1. *Raphanus sativus* L. Wild Radish. Fig. 2019.

Raphanus sativus L. Sp. Pl. 669. 1753.

Biennial or annual, from a more or less elongated fleshy root; stems erect and freely branching, 3–5 dm. high, sparsely pubescent with stiff hairs or nearly glabrous above. Lower leaves deeply lyrate-pinnatifid, the lobes crenate or dentate; petals 15–20 mm. long, the narrow claw about equalling the blade, variable in color, white, yellowish, or purplish, but usually purple-veined; pods fleshy, 2 to several-seeded, not longitudinally grooved, often equaled or exceeded by the long conical beak.

A very common weed in the Pacific States, especially California. Native of Europe. A cultivated form is the garden radish. March–July.

2. *Raphanus Raphanistrum* L. Jointed Charlock. Fig. 2020.

Raphanus Raphanistrum L. Sp. Pl. 669. 1753.

Biennial or annual, from a slender root; stem freely branching, 3–7 dm. high, sparsely pubescent at least below with stiff hairs. Lower leaves deeply lyrate-pinnatifid; petals usually yellow, rarely purplish, fading to white, 15–20 mm. long; pod usually 6–10-seeded, nearly cylindrical when green, constricted between the seeds and moniliform when dry, longitudinally grooved; beak conical, 1–2 cm. long.

Occasionally adventive in the Pacific States. Native of Europe and northern Asia. April–June.

25. *BARBARÈA* R. Br. in Ait. Hort. Kew. ed. 2. 4: 109. 1812.

Erect glabrous biennial or perennial herbs, with angled stems, pinnatifid leaves and racemose yellow flowers. Pod elongated, linear, 4-angled; valves keeled or ribbed; style

short; stigma 2-lobed or capitate. Seeds in 1 row in each cell, flat, oblong, marginless; cotyledons accumbent. [Name in honor of Saint Barbara.]

A genus of about 7 species, natives of the temperate zones. Type species, *Barbarea vulgaris* R. Br.

1. *Barbarea americana* Rydb. American Winter Cress. Fig. 2021.

Barbarea americana Rydb. Mem. N.Y. Bot. Gard. 1: 174. 1900.

Barbarea orthoceras var. *dolichocarpa* Fernald, Rhodora 11: 140. 1909.

Biennial, glabrous throughout, often purple-tinged, the stems rather stout, erect, 3–6 dm. high. Basal leaves lyrate-pinnatifid, with a large terminal leaflet and 2–4 pairs of small lateral ones, the stem leaves lyrate-pinnatifid or lobed, becoming reduced above; petals pale yellow; pods ascending, 3–4.5 cm. long, 1.5 mm. broad, obscurely 4-angled; beak rather stout, 1–1.5 mm. long.

Moist places, Transition and Upper Sonoran Zones; British Columbia to Montana, south to northern Mexico and Lower California. This is a native species long confused with *B. vulgaris* L. which is widely introduced in the eastern United States. Type locality: Spanish Basin, Montana. March–Oct.

Barbarea stricta Andr. in Bess. Enum. Pl. Volh. 72. 1822. Differs from the native species chiefly in the stouter pods which are erect and appressed to the rachis. Widely introduced in the United States but rare on the Pacific Coast. This has been referred by some authors to *B. orthoceras* Ledeb. Native of Europe.

Barbarea verna (Mill.) Aschers. Fl. Brand. 1: 36. 1864. Divisions of the leaves more numerous, usually 4–8 pairs of rather narrow lateral leaflets; pods sharply 4-sided and slightly compressed, spreading or ascending. In waste places, sparingly introduced in the Pacific States. Native of Europe.

26. RORÍPPA Scop. Fl. Carn. 520. 1760.

Aquatic or marsh herbs, with simple or pinnate, lobed, dissected or rarely entire leaves and small white or yellow, racemose flowers. Sepals spreading. Stamens often less than 6. Style short or slender; stigma 2-lobed or nearly entire. Pods short, terete or nearly so, not stipitate; valves nerveless or 1-nerved. Seeds minute, turgid, in 2 rows in each cell; cotyledons accumbent. [Name unexplained.]

About 50 species, of wide distribution, but mainly in the north temperate zone. Type species, *Sisymbrium amphibium* L. The older generic name *Radicula* Hill (1756) is not available according to the International Rules, Art. 67. The original spelling, *Rorippa*, was changed by Adanson to *Roripa*, and many authors have used that spelling but according to the International Rules the original spelling should be retained.

Flowers white.

Leaves pinnately divided; pods linear.

1. *R. Nasturtium-aquaticum*.

Leaves at least the upper simple; pods ovoid.

8. *R. Armoracia*.

Flowers yellow; leaves pinnatifid or pinnate.

Plants perennial by creeping rootstocks; petals well exceeding the sepals.

Pods glabrous or nearly so.

2. *R. sinuata*.

Pods short-pubescent.

3. *R. columbiana*.

Plants annual, biennial, or perennial, with fibrous roots, and without creeping rootstocks; petals scarcely equaling the sepals.

Stems diffusely branching from the base; pedicels 2–4 mm. long.

Pods strongly curved; leaf-segments linear to oblong, mostly acute; style not over 0.5 mm. long, stout.

4. *R. curvisiliqua*.

Pods not curved; leaf-segments obovate or rounded; style 1–2 mm. long, slender.

5. *R. obtusa*.

Stems erect, branched above; pedicels 6–8 mm. long.

Stems nearly or quite glabrous; pods linear or linear-oblong.

6. *R. palustris*.

Stems hispid-pubescent; pods globose or ovoid.

7. *R. hispida*.

1. *Rorippa Nasturtium-aquaticum* (L.) Schinz & Thell. Water-cress.

Fig. 2022.

Sisymbrium Nasturtium-aquaticum L. Sp. Pl. 657. 1753.

Nasturtium officinale R. Br. in Ait. Hort. Kew. ed. 2. 4: 110. 1812.

Radicula Nasturtium-aquaticum Britten & Rendle, List Brit. Seed-Plants 3. 1907.

Rorippa Nasturtium-aquaticum Schinz & Thell. Fl. Schweiz ed. 3. 240. 1909.

Stems floating, creeping or ascending, rooting at the nodes, glabrous. Leaves pinnately divided into ovate or oval segments, the terminal larger; racemes elongated in fruit; petals white, 3–4 mm. long; pedicels 1–2 cm. long; pods 1–3 cm. long, 2 mm. wide, spreading or slightly curved upwards.

Margins of streams, or quiet water; naturalized and common in the Pacific States. Native of Eurasia. March–Nov.

2. *Rorippa sinuata* (Nutt.) A. S. Hitchcock. Spreading Yellow-cress.

Fig. 2023.

Nasturtium sinuatum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 73. 1838.

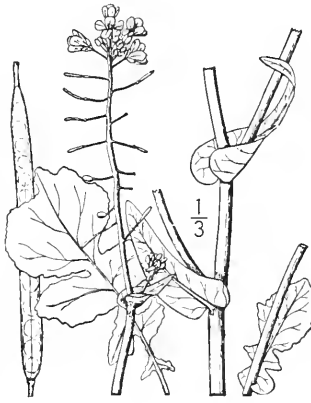
Rorippa sinuata A. S. Hitchcock, Spring Fl. Manhattan 18. 1894.

Radicula sinuata Greene, Leaflets Bot. Obs. 1: 113. 1905.

Perennial from creeping rootstocks, diffuse, glabrous, the branches ascending. Leaves 5–8 cm. long, pinnatifid, the segments linear to oblong, obtuse, entire or sparingly dentate; pedicels



2015



2016



2017



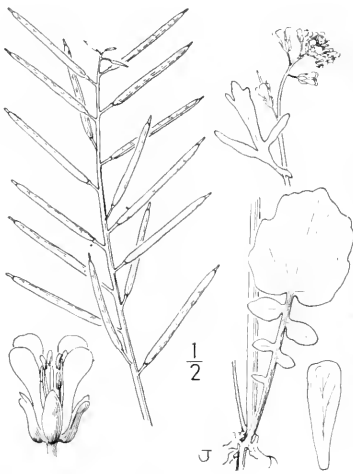
2018



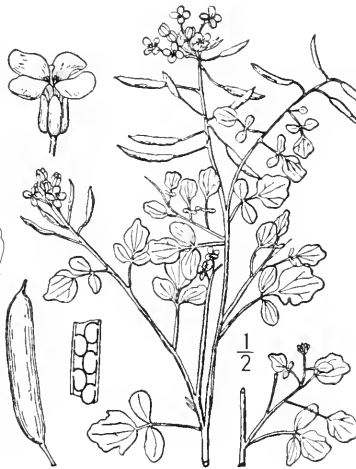
2019



2020



2021



2022



2023

2015. *Brassica juncea*
 2016. *Brassica campestris*
 2017. *Diplotaxis tenuifolia*

2018. *Diplotaxis muralis*
 2019. *Raphanus sativus*
 2020. *Raphanus raphanistrum*
 2021. *Barbarea americana*

2022. *Rorippa nasturtium-aquaticum*
 2023. *Rorippa sinuata*

slender, 6 mm. long; pods linear-oblong, straight or slightly curved, smooth or slightly roughened, 8–14 mm. long; style slender, 2–3 mm. long.

Moist sandy soil, mainly Upper Sonoran Zone; eastern Washington and Oregon to Saskatchewan, Illinois, Texas, and Arizona. Type locality: "Banks of the Oregon [Columbia] and its tributaries." April–Sept.

3. *Rorippa columbiae* Suksdorf. Columbia Yellow-cress. Fig. 2024.

Nasturtium sinuatum var. *columbiae* Suksdorf ex Robinson, Syn. Fl. N. Amer. 1: 147. 1895.

Rorippa columbiae Suksdorf ex Howell, Fl. N.W. Amer. 1: 40. 1897.

Nasturtium columbiae Suksdorf, Deutsch. Bot. Monatss. 16: 211. 1898.

Radicula columbiae Greene, Leaflets Bot. Obs. 1: 114. 1905.

Plants perennial by creeping rootstocks, pubescent throughout, the stems low and spreading. Leaves pinnatifid, with many oblong, often toothed segments; pedicels ascending or spreading; petals 4 mm. long; pod ascending or erect, short-oblong, curved, densely puberulent or somewhat papillose; style nearly 2 mm. long.

Moist sandy soil, Transition and Upper Sonoran Zones; eastern Washington and Oregon to Montana, Nebraska, and New Mexico. Type locality: "low gravelly banks of the Columbia River, near Bingen," Washington. May–Sept.

4. *Rorippa curvisiliqua* (Hook.) Bessey. Western Yellow-cress. Fig. 2025.

Sisymbrium curvisiliqua Hook, Fl. Bor. Amer. 1: 61. 1830.

Nasturtium curvisiliqua Nutt. in Torr. & Gray, Fl. N. Amer. 1: 73. 1838.

Nasturtium lyratum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 73. 1838.

Rorippa curvisiliqua Bessey, Mem. Torrey Club 5: 169. 1894.

Radicula curvisiliqua Greene, Leaflets Bot. Obs. 1: 113. 1905.

Annual or biennial, glabrous, the stems usually diffusely branched, the branches ascending, 1–3 dm. high. Leaves pinnatifid, with oblong, mostly obtuse segments; pedicels 2–6 mm. long; pod curved, 8–12 mm. long, about 1 mm. thick; style less than 1 mm. long.

Wet places, Upper Sonoran and Transition Zones; British Columbia to Wyoming, and through the Pacific States to Lower California. Type locality: "Common on the Northwest coast of America, Latitude 47° to 48°, in sandy soils, near streams." March–Nov.

5. *Rorippa obtusa* (Nutt.) Britt. Blunt-leaved Yellow-cress. Fig. 2026.

Nasturtium obtusum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 74. 1838.

Rorippa obtusa Britt. Mem. Torrey Club 5: 169. 1894.

Radicula obtusa Greene, Leaflets Bot. Obs. 1: 113. 1905.

Annual, glabrous, the stems diffusely branched at the base, 1–3 dm. high. Leaves pinnatifid, with obovate or rounded, sinuately toothed divisions; pedicels ascending or spreading, 2–4 mm. long; petals narrowly spatulate, 1 mm. long; pods 4–8 mm. long, 1–2 mm. thick; style about 1 mm. long.

Wet places, Upper Sonoran and Arid Transition Zones; eastern Washington to southern California, east to Michigan, Utah, Texas, and Missouri. Type locality: "banks of the Mississippi." May–Sept.

6. *Rorippa palustris* (L.) Bess. Marsh Yellow-cress. Fig. 2027.

Sisymbrium amphibium var. *palustre* L. Sp. Pl. 657. 1753.

Radicula palustris Moench, Meth. 263. 1794.

Nasturtium terrestre R. Br. in Ait. Hort. Kew. ed. 2. 4: 110. 1812.

Rorippa palustris Bess. Enum. Pl. Volh. 27. 1821.

Nasturtium palustre DC. Syst. 2: 191. 1821.

Annual or biennial, glabrous or nearly so, its stems erect, branching above, 3–8 dm. high. Lower leaves lyrate-pinnatifid, petiolate, the upper nearly sessile, dentate or somewhat lobed; pedicels slender, 6 mm. long in fruit; petals 2 mm. long; pods linear or linear-oblong, spreading or curved, 5–7 mm. long; style 1 mm. long.

Marshes, often growing in water, Boreal and Austral Zones; Alaska to Labrador south to California, Georgia, and Mexico; also Europe and Asia. Type locality: in Europe. May–Sept.

Rorippa palustris subsp. *occidentale* (S. Wats.) Abrams. (*Nasturtium terrestre* var. *occidentale* S. Wats. in A. Gray, Syn. Fl. N. Amer. 1: 148. 1895; *Rorippa pacifica* Howell, Fl. N.W. Amer. 40. 1897; *R. palustris* var. *pacifica* G. N. Jones, Univ. Wash. Pub. Biol. 5: 161. 1936.) Mainly distinguished by the longer (8–12 mm.) pods. This is the more common form of the species on the Pacific Coast ranging from Alaska to central California.

7. *Rorippa hispidus* (Desv.) Britt. Hispid Yellow-cress. Fig. 2028.

Brachylobus hispidus Desv. Journ. Bot. 3: 183. 1814.

Nasturtium hispidum DC. Syst. 2: 201. 1821.

Rorippa hispida Britt. Mem. Torrey Club 5: 169. 1894.

Radicula hispida Britt. Torreyia 6: 30. 1906.

Radicula palustris var. *hispida* Robinson, Rhodora 10: 32. 1908.

Annual or biennial, the stems stout, erect, branching above the base, 3–12 dm. high, the branches, petioles and veins on the lower surface of the leaves hirsute with spreading hairs. Leaves lyrate-pinnatifid; pedicels slender, spreading, about 6 mm. long, pods ovoid, 4–6 mm. long, glabrous; style 1 mm. long.

Marshes, often growing in shallow water, Boreal and Austral Zones; Alaska to New Brunswick, south to Washington, California, New Mexico, and Florida. Type locality: Pennsylvania. June–Aug.

8. Rorippa Armoràcia (L.) A. S. Hitchcock. Horseradish. Fig. 2029.*Cochlearia Armoracia* L. Sp. Pl. 648. 1753.*Nasturtium Armoracia* Fries ex A. Gray, Man. ed. 2. 31. 1856.*Rorippa Armoracia* A. S. Hitchcock, Spring Fl. Manhattan 18. 1894.*Radicula Armoracia* Robinson, Rhodora 10: 32. 1908.*Armoracia Armoracia* Britt. in Britt. & Brown, Ill. Fl. ed. 2. 2: 163. 1913.

Stems erect, 6–10 dm. high, from deep thick roots. Basal leaves 15–30 cm. long oblong, crenate or serrate or sometimes pinnatifid, rough but glabrous, on stout petioles; stem leaves sessile, smaller; racemes paniculate; pedicels very slender, 4–6 mm. long, ascending; flowers white, showy, 4–8 mm. broad.

Escaped from gardens in moist places, especially in Washington and Oregon, adventive from Europe. May–July.

Rorippa austriaca (Crantz) Spach, Hist. Veg. 6: 513. 1838. (*Radicula austriaca* Jepson, Fl. Calif. 2: 54. 1936.) Erect annual, 3–6 dm. high, puberulent. Leaves 3–6 cm. long, oblong-obovate, narrowed to the auriculate base, unequally serrate, glabrous; racemes paniculate at the summit, 7–15 cm. long; petals yellow, 4 mm. long; fruiting pedicels spreading, 4–10 mm. long; pods 2–3 mm. long and nearly as broad. Reported as a weed in cultivated fields in Modoc County, California (M. K. Bellue, Mo. Bull. Calif. Dept. Agr. 22: 385. 1933). Native of Austria.

27. CARDÁMINE [Tourn.] L. Sp. Pl. 654. 1753.

Annual or perennial herbs, with entire, lobed or divided leaves, and white or purple flowers in racemes or corymbs. Stamens 6, rarely 4. Pod elongated, compressed parallel with the partition; valves nerveless, elastically dehiscent. Seeds in 1 row in each cell, wingless; cotyledons accumbent. [Name Greek, meaning heart-strengthening, an ancient name for some cress supposed to have that quality.]

A genus of about 125 species, natives of the temperate regions. Type species, *Cardamine pratensis* L.

Leaves all simple.

Leaves ovate or elliptical, entire; dwarf plants.

1. *C. bellidifolia*.

Leaves cordate or reniform, sinuate; stems 2–6 dm. high.

2. *C. Lyallii*.

Leaves, at least those of the stem, compound.

Basal leaves simple; stem leaves 3–5-foliate.

3. *C. Breweri*.

Basal leaves pinnate.

Leaves 3-foliate, rarely 5-foliate; leaflets 3-lobed or 3-toothed; petals 8–12 mm. long.

4. *C. angulata*.

Leaves 5–15-foliate, or the basal sometimes 3-foliate.

Perennials with rootstocks.

Petals 5–6 mm. long.

5. *C. Gambellii*.

Petals 2–4 mm. long.

Racemes elongated.

6. *C. occidentalis*.

Racemes subumbellate.

7. *C. umbellata*.

Annuals.

Petals 6 mm. long, rose-purple.

8. *C. Pattersonii*.

Petals 2–3 mm. long, white.

Pod 20–30-seeded; leaflets oblong or linear.

9. *C. pennsylvanica*.

Pod 8–20-seeded; leaflets mostly rounded.

10. *C. oligosperma*.

1. Cardamine bellidifolia L. Alpine Bitter-cress. Fig. 2030.*Cardamine bellidifolia* L. Sp. Pl. 654. 1753.*Cardamine bellidifolia* var. *pachyphylla* Leiberg, Proc. Biol. Soc. Wash. 11: 170. 1897.

Glabrous perennial, tufted from a branched caudex, the roots fibrous, the stems 3–10 cm. high. Leaves long-petioled, ovate, 10–15 mm. long, entire or with 1 or 2 lateral teeth; flowers 1–5; petals white, spatulate, 3–4 mm. long; pods erect, linear, 2–4 cm. long, 2 mm. wide; style stout, about 1 mm. long.

Arctic-Alpine species; Alaska south to Mount Adams, Washington, Crater Lake, Oregon, and Mount Shasta and Mount Lassen, California, east to Greenland and the White Mountains, New Hampshire; also in Europe and Asia. July.

2. Cardamine Lyallii S. Wats. Lyall's Bitter-cress. Fig. 2031.*Cardamine Lyallii* S. Wats. Proc. Amer. Acad. 22: 456. 1887.*Cardamine Lyallii* var. *pilosa* O. E. Schulz, Bot. Jahrb. 32: 438. 1903.*Cardamine cordifolia* var. *Lyallii* A. Nels. & Macbr. Bot. Gaz. 61: 31. 1916.

Plants glabrous or sparsely pilose, the stems erect from a running rootstock, 2–6 dm. high, simple or branched. Leaves 4–8, petiolate, cordate to reniform, 2.5–7.5 cm. long, entire or shallowly sinuate; pedicels spreading; petals white; pods erect, 2–4 cm. long, shortly attenuate; style very short.

Montane, Hudsonian and Canadian Zones; Cascade Mountains, southern British Columbia, to Placer County, California, east to the Blue Mountains, Oregon, and northern Nevada. Type locality: "Banks of the Ashtnola, Cascade Mountains." July–Aug.

3. Cardamine Breweri S. Wats. Brewer's Bitter-cress. Fig. 2032.*Cardamine Breweri* S. Wats. Proc. Amer. Acad. 10: 339. 1875.*Cardamine orbicularis* Greene, Pittonia 4: 202. 1901.

Plants perennial from slender rootstocks, glabrous or slightly pubescent, the stems erect or

nearly so, 2-3 dm. high, branched. Basal leaves simple, reniform or broadly cordate, subentire or sinuate, or some of them with a pair of lateral leaflets; stem leaves mostly 5-foliolate, the leaflets orbicular to oblong, usually sinuate; petals white, 4 mm. long; pedicels 8-15 mm. long; pods ascending or erect, 15-25 mm. long; style very short and thick.

Along streams, Canadian and Transition Zones; British Columbia to the southern Sierra Nevada, California, east to Montana and Wyoming. Type locality: near Sonora Pass at 8,000-10,000 feet altitude, California. June-July.

Cardamine Leibergii Holz. Contr. U.S. Nat. Herb. 3: 212. 1895. (*Cardamine vallicola* subsp. *Leibergii* O. E. Schulz, Bot. Jahrb. 32: 523. 1903.) Very similar to *C. Breweri* and doubtfully distinct. It differs chiefly in having leaf margins crenate or crenately 7-9-lobed instead of merely sinuate. Wet spring places, Arid Transition Zone; vicinity of Spokane, Washington, to northern Idaho. Type locality: near summit of Packsaddle Peak, Kootenai County, Idaho.

4. *Cardamine angulata* Hook. Seaside Bitter-cress. Fig. 2033.

Cardamine angulata Hook. Fl. Bor. Amer. 1: 44. 1829.

Cardamine angulata var. *pentaphylla* O. E. Schulz, Bot. Jahrb. 32: 407. 1903.

Perennial from a running rootstock, glabrous, the stems erect, 3-6 dm. high, mostly simple. Leaves pinnate; leaflets 3-5, petiolulate, ovate to oblong, mostly crenate, the terminal one 3-5-toothed; petals white, 8-12 mm. long; pods spreading, about 2 cm. long, nearly 2 mm. thick; style stout, 2 mm. long.

Wet places and shallow water, mostly Humid Transition Zone; British Columbia to western Oregon, east to Wyoming. Type locality: "Banks of the Columbia." May-June.

5. *Cardamine Gambellii* S. Wats. Gambell's Bitter-cress. Fig. 2034.

Cardamine Gambellii S. Wats. Proc. Amer. Acad. 11: 147. 1876.

Perennial, the stout decumbent stems rooting at the lower joints, 3-10 dm. high. Leaves mostly basal, rosulate, pinnate; leaflets 4-6 pairs, ovate to oblong-linear, few-toothed, 6-20 mm. long; raceme nearly sessile, elongated in fruit; petals white, 6 mm. long; pedicels divaricate, equaling the pods; pods erect or ascending, often curved, 15-20 mm. long; style slender, 2 mm. long.

Swamps and ditches, Upper Sonoran Zone; Santa Barbara County, California, to Lower California and Mexico. Type locality: near Santa Barbara, California. April-June.

6. *Cardamine occidentalis* (S. Wats.) Howell. Western Bitter-cress. Fig. 2035.

Cardamine palustris var. *occidentalis* S. Wats. in A. Gray, Syn. Fl. N. Amer. 1^a: 158. 1895.

Cardamine occidentalis Howell, Fl. N.W. Amer. 50. 1897.

Perennial from a short somewhat tuberous rootstock, glabrous or pubescent below, the stems erect, 2-4 dm. high, branched. Leaves all pinnate; leaflets 3-6 pairs, subentire, those of the basal leaves rounded, of the stem leaves obovate to oblong or linear; pedicels 1-2 cm. long; petals white, 3-4 mm. long; pods 20-25 mm. long, very slender, erect or nearly so, stigma nearly sessile.

In wet places, mainly Transition Zone; Yakima and Klickitat Valleys, Washington, to the Willamette Valley, Oregon. Type locality: Sauvie Island, Oregon. May-July.

7. *Cardamine umbellata* Greene. Umbel-flowered Bitter-cress. Fig. 2036.

Cardamine sylvatica var. *kamtschatica* Regel, Bull. Soc. Nat. Mosc. 34: 172. 1861.

Cardamine umbellata Greene, Pittonia 3: 154. 1897.

Cardamine kamtschatica O. E. Schulz, Bot. Jahrb. 32: 470. 1903.

Plants perennial from slender running rootstocks, glabrous or nearly so, the stems several, erect, 2-5 dm. high. Leaves pinnate, the basal with 3-5 rounded or oval leaflets, the upper with oblong leaflets; flowers in a short corymb; pedicels ascending, 4-6 mm. long; petals spatulate, 3-4 mm. long; pods crowded, erect, 20-25 mm. long, slender; beak minute.

Wet places, mainly Arctic-Alpine Zone; Alaska to Oregon, Alberta, and Colorado. Type locality: St. Paul Island, Behring Sea. June-Aug.

8. *Cardamine Pattersonii* Henderson. Patterson's Bitter-cress. Fig. 2037.

Cardamine Pattersonii Henderson, Rhodora 32: 25. 1930.

Annual, branching from the base, branches erect or ascending, about 1 dm. high, glabrous. Basal leaves 2 cm. long, pinnate; leaflets usually 5, oblong-obovate, entire, 3-4 mm. long, the terminal larger and obscurely 3-lobed; stem leaves few, reduced, mostly with 3 leaflets; flowers rather distant; pedicels 1-2 cm. long, divaricate; sepals oval, 2.5 mm. long, thin and tinged with brown and rose; petals rose-purple, 6 mm. long; pods 20-25 mm. long, 1 mm. wide, flattened; beak slender, 3-4 mm. long; seeds flattened, 1.5 mm. long.

Mossy rocks, Humid Transition Zone; Clatsop County, Oregon. Type locality: Saddle Mountain, altitude 2,800 feet, Oregon. May-June.

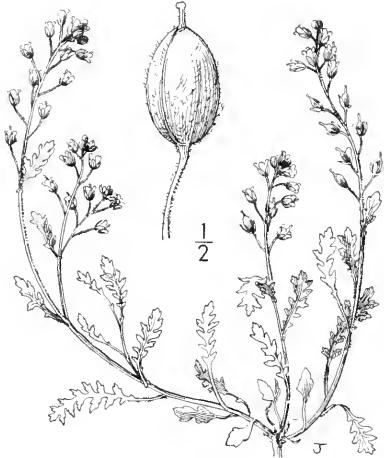
9. *Cardamine pennsylvanica* Muhl. Pennsylvania Bitter-cress. Fig. 2038.

Cardamine pennsylvanica Muhl. ex Willd. Sp. Pl. 3: 486. 1800.

Cardamine hirsuta var. *acuminata* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 85. 1838.

Cardamine acuminata Rydb. Bull. Torrey Club 29: 237. 1902.

Annual or perhaps sometimes biennial with fibrous roots, glabrous or with a few scattered



2024



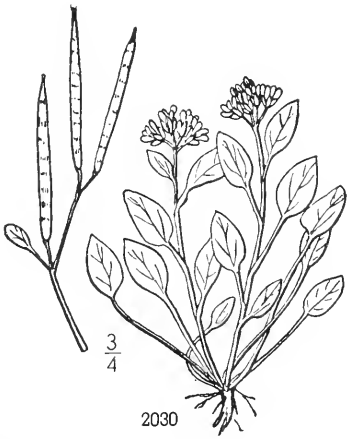
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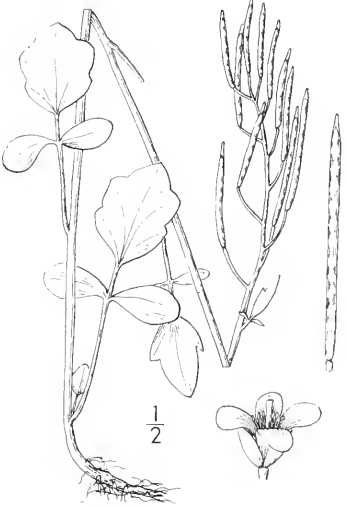
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2024. *Rorippa columbiae*
2025. *Rorippa curvisiliqua*
2026. *Rorippa obtusa*

2027. *Rorippa palustris*
2028. *Rorippa hispida*
2029. *Rorippa Armoracia*

2030. *Cardamine bellidifolia*
2031. *Cardamine Lyallii*
2032. *Cardamine Breweri*

hairs, the stem erect, 2–10 dm. high, branched and rather succulent, leafy up to the racemes. Basal leaves with 3–8 pairs of leaflets, these oblong to obovate, toothed or entire; petals white; fruiting pedicels ascending or divergent, 4–6 mm. long; pods very slender, 1.5–3 cm. long, less than 1 mm. wide; style about 1 mm. long.

In swamps and wet places, mainly Transition Zone; British Columbia to Newfoundland, south to Nevada County, California, Colorado, and Florida. Type locality: Pennsylvania. May–June.

10. *Cardamine oligosperma* Nutt. Few-seeded Bitter-cress. Fig. 2039.

Cardamine oligosperma Nutt. in Torr. & Gray, Fl. N. Amer. 1: 85. 1838.

Annual, sparsely hirsute throughout or nearly glabrous, the stem erect, simple or little-branched, 1–4 dm. high. Basal leaves rosulate, pinnate; leaflets 5–11, petiolulate, oval to orbicular, 1–5-lobed or -toothed; racemes few-flowered; petals spatulate, about 2.5 mm. long; fruiting pedicels ascending, 3–6 mm. long; pods erect, 2–3 cm. long, 1–1.25 mm. wide; beak 1 mm. long or less.

Moist or wet places, in woods, Upper Sonoran and Transition Zone; British Columbia and Idaho to southern California. Type locality: "Shady woods of the Oregon [Columbia]." March–July.

28. DENTARIA [Tourn.] L. Sp. Pl. 653. 1753.

Perennial herbs, with fleshy horizontal scaly or toothed rootstocks, and erect, mostly simple stems leafless below. Leaves 3-divided or palmately lacinate or sometimes nearly entire, the basal (rhizomal) arising from the rootstocks and free from the flowering stem, long-petioled, the stem leaves 2 or 3, occurring at or above the middle of the stem. Flowers white or purple, corymbose or racemose. Style elongated. Pod linear, flattened parallel with the partition; valves nerveless or only faintly 1-nerved, elastically dehiscent. Seeds in 1 row in each cell, wingless; cotyledons thick, accumbent. [Name Greek, meaning tooth, in reference to the tooth-like divisions of the rootstock.]

About 12 species, natives of the northern hemisphere. The species are sometimes called Pepperwort, from their pungent rootstocks. Type species, *Dentaria pentaphyllos* L.

Rhizomes slender and elongated, if tuberous the tubers not over 3 mm. thick.

1. *D. tenella*.

Rhizomes tuberous, 5–10 mm. thick.

Tubers 7–10 mm. thick, orange-yellow; petals deep purple.

2. *D. gemmata*.

Tubers less than 7 mm. thick, whitish; petals white or rose.

Siliques 2.5–4 mm. wide; rhizomal leaf coarsely 5–9-toothed above the middle; stem leaves usually simple.

3. *D. pachystigma*.

Siliques 1.5–2 mm. wide; rhizomal leaf simple or lobed with entire, undulate or sinuate margins; stem leaves 3–5-foliolate except in var. *cardiophylla*.

4. *D. californica*.

1. *Dentaria tenella* Pursh. Slender Toothwort. Fig. 2040.

Dentaria tenella Pursh, Fl. Amer. Sept. 2: 439. 1814.

Cardamine Nuttallii Greene, Bull. Calif. Acad. 2: 389. 1887.

Cardamine tenella O. E. Schulz, Bot. Jahrb. 32: 389. 1903.

Rhizomes slender, elongated, about 3 mm. thick and 15–50 mm. long, rarely ovoid, plant glabrous throughout, stem slender, 1–2 dm. high, simple. Rhizomal leaves usually simple, rarely 3–5-lobed, orbicular, cordate, 1.5–4 cm. long, crenately 5–9-toothed or -lobed; stem leaves 1–3, on the upper part of the stem, 3-foliolate or rarely 5-foliolate; leaflets narrowly lanceolate to narrowly ovate, usually entire; raceme few-flowered; petals 9–15 mm. long, rose-colored; siliques 15–50 mm. long, about 1.5 mm. wide; style slender, 3–6 mm. long; stigma capitate; fruiting pedicels 1–3 cm. long.

Moist meadows, Humid Transition Zone; British Columbia south, west of the Cascade Mountains Divide, to Josephine County, Oregon. Type locality: banks of the Columbia River, somewhere below the Cascades. March–May.

Dentaria tenella var. *pulcherrima* (Greene) Detling, Amer. Journ. Bot. 23: 573. 1936. (*Dentaria macrocarpa* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 88, 1838. *Cardamine pulcherrima* Greene, Erythea 1: 148. 1893. *Dentaria macrocarpa* var. *pulcherrima* Robinson in A. Gray, Syn. Fl. N. Amer. 1: 154. 1895.) Plants stouter, the foliage rather thick and fleshy; rhizomal leaves 3–5-foliolate. Moist woods, the common form in the Columbia Gorge extending eastward to Wasco, Oregon, and Yakima, Washington; also to Mount Rainier, Washington, and southwestern Oregon.

2. *Dentaria gemmata* (Greene) Howell. Yellow-tubered Toothwort. Fig. 2041.

Cardamine gemmata Greene, Pittonia 1: 162. 1888.

Dentaria gemmata Howell, Fl. N.W. Amer. 1: 49. 1897.

Cardamine californica var. *gemma* O. E. Schulz, Bot. Jahrb. 32: 387. 1903.

Rhizomes ovoid, 7–10 mm. thick, orange-yellow, stems rather stout, 10–25 cm. high, simple. Rhizomal leaves 3–5-foliolate, the leaflets ovate, 1–4 cm. long, thick, sinuately lobed or toothed, the teeth or lobes mucronate, petiolulate or sessile; stem leaves usually 2, 3–7-foliolate, the leaflets sessile and often confluent, oblong to narrowly lanceolate, 1–2.5 cm. long, entire or the terminal leaflets sometimes coarsely toothed; raceme short, seldom over 4 cm. long; petals 10–15 mm. long, deep purple; siliques 3–5 cm. long, 1–2 mm. wide; pedicels 15–20 mm. long; style about 5 mm. long; stigma capitate.

Wet banks and shallow running water, Transition Zones; Josephine County, Oregon, to Del Norte County, California. Type locality: near Waldo, Oregon.

3. *Dentaria pachystigma* S. Wats. Stout-beaked Toothwort. Fig. 2042.

Dentaria californica var. *pachystigma* S. Wats. Proc. Amer. Acad. 14: 289. 1879.

Dentaria pachystigma S. Wats. in A. Gray, Syn. Fl. N. Amer. 1^a: 155. 1895.

Glabrous, the stems stout, about 15 cm. high. Rhizomal leaves cordate-orbicular, crenately toothed, stem leaves 2 or 3, approximate, simple, cordate or reniform, crenate or sinuate or more frequently coarsely dentate; raceme nearly sessile; pods 2.5–5 cm. long, 3–4 mm. broad; style short and stout; seeds nearly orbicular; cotyledons thick.

The typical form of this species is little known. It was originally collected in the mountains of Plumas County, California, and our illustration is made from the type specimens in the Gray Herbarium, Harvard University.

Dentaria pachystigma var. *corymbosa* (Jepson) Abrams. (*Dentaria corymbosa* Jepson, Man. Fl. Pl. Calif. 426. 1925.) Style narrower, scarcely flattened, 4–10 mm. long; racemes short, almost corymbose. This is the common form of the species, ranging from Shasta to the South Yolla Bolly Mountains, Lake County, and to Tulare County in the Sierra Nevada, California.

Dentaria pachystigma var. *dissectifolia* Detling, Amer. Journ. Bot. 23: 575. 1936. Stem leaves pinnately 3–5-foliolate. Serpentine rocks, Mogalia, Butte County, California.

4. *Dentaria californica* Nutt. California Toothwort. Fig. 2043.

Dentaria californica Nutt. in Torr. & Gray, Fl. N. Amer. 1: 88. 1838.

Cardamine californica Greene, Fl. Fran. 266. 1891.

Glabrous or slightly pubescent, often more or less purplish. Leaves rather thin, not fleshy; rhizomal leaves entire or trifoliate, mostly orbicular, the blades or leaflets commonly dentate or lobed; stem leaves 3-foliate, the leaflets lanceolate-oblong to nearly linear, more or less toothed; flowers white or pale rose; pods 2.5–6 cm. long, 2–3 mm. wide; styles 3–5 mm. long. Shady banks and rich woods, Upper Sonoran and Transition Zones; southern Oregon to northern Lower California. Type locality: Monterey, California. Feb.–April.

Dentaria californica var. *cuneata* (Greene) Detling, Amer. Journ. Bot. 23: 576. 1936. (*Cardamine cuneata* Greene, Bull. Calif. Acad. 1: 74. 1888. *Cardamine californica* subsp. *cuneata* O. E. Schulz, Bot. Jahrb. 32: 386. 1903.) Leaves more ample and at least those of the stem 5-foliate. Santa Lucia and Gabilan Mountains, Monterey County, California. Type locality: near Jolon.

Dentaria californica var. *sinuata* (Greene) Detling, Amer. Journ. Bot. 23: 576. 1936. (*Dentaria sinuata* Greene, Pittonia 3: 123. 1896. *Cardamine californica* var. *sinuata* O. E. Schulz, Bot. Jahrb. 32: 387. 1903. *Dentaria californica* var. *Tracyi* Jepson, Man. Fl. Pl. Calif. 426. 1925.) Plants 15–35 cm. high. Basal leaf simple, round-reniform, cordate at base, 5–7.5 cm. broad, sinuately lobed; stem leaves 2 or 3, 3–5-foliate, lobed or coarsely toothed; petals 10–15 mm. long, rose-purple; style 3–5 mm. long. This variety grows on wooded slopes in the Humid Transition Zone from Coos County, Oregon, to Mendocino County, California. Type locality: Redwoods, near Crescent City, California.

Dentaria californica var. *integrifolia* Detling, Amer. Journ. Bot. 23: 576. 1936. (*Dentaria integrifolia* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 88. 1838.) Glabrous or slightly pubescent, stem 1.5–6 dm. high, stout. Leaves rather thick and fleshy, the blades or leaflets entire; basal leaves simple or trifoliate, orbicular, ovate or reniform, 2–8 cm. long; stem leaves 3-foliate or sometimes 5-foliate, the leaflets ovate to lanceolate or linear; flowers white; petals 10–15 mm. long, scarcely spreading; pods flattened, 25–35 mm. long; style stout, 3–4 mm. long. Low moist fields near the coast, Sonoran and Transition Zones; central California. Type locality: "Plains of Monterey, California."

Dentaria californica var. *cardiophylla* (Greene) Detling, Amer. Jour. Bot. 23: 576. 1936. (*Cardamine cardiophylla* Greene, Fl. Fran. 266. 1891. *Dentaria cardiophylla* Robinson, Syn. Fl. N. Amer. 1^a: 155. 1895. *Dentaria integrifolia* var. *cardiophylla* Jepson, Man. Fl. Pl. Calif. 426. 1925.) Glabrous, the stems usually simple from a small tuber, 1.5–3 dm. high. Leaves all simple, the basal round-cordate, those of the stem round-cordate to lanceolate, sinuate to acutely toothed, 1.5–3 cm. long, petals rose-colored; pods 25–35 mm. long, 2 mm. broad; style slender, 3–4 mm. long. Shady banks, Sonoran and Transition Zones; Inner North Coast Ranges and northern Sierra Nevada, California. Type locality: Vaca Mountains, Solano County, California.

29. *IDAHOA* A. Nels. & Macbr. Bot. Gaz. 56: 474. 1913.

Low slender scapose glabrous annuals with lyrate basal leaves. Flowers solitary. Sepals broad, erect. Petals white, small, spatulate. Silicles suborbicular, strongly flattened parallel to the partition. Seeds in 2 rows in each cell, reticulate, broadly winged. [Named for the state of Idaho.]

A monotypic genus of the Great Basin region.

1. *Idahoia scapigera* (Hook.) A. Nels. & Macbr. Flat-pod. Fig. 2044.

Platyspermum scapigerum Hook. Fl. Bor. Amer. 1: 68. pl. 8. fig. B. 1830.

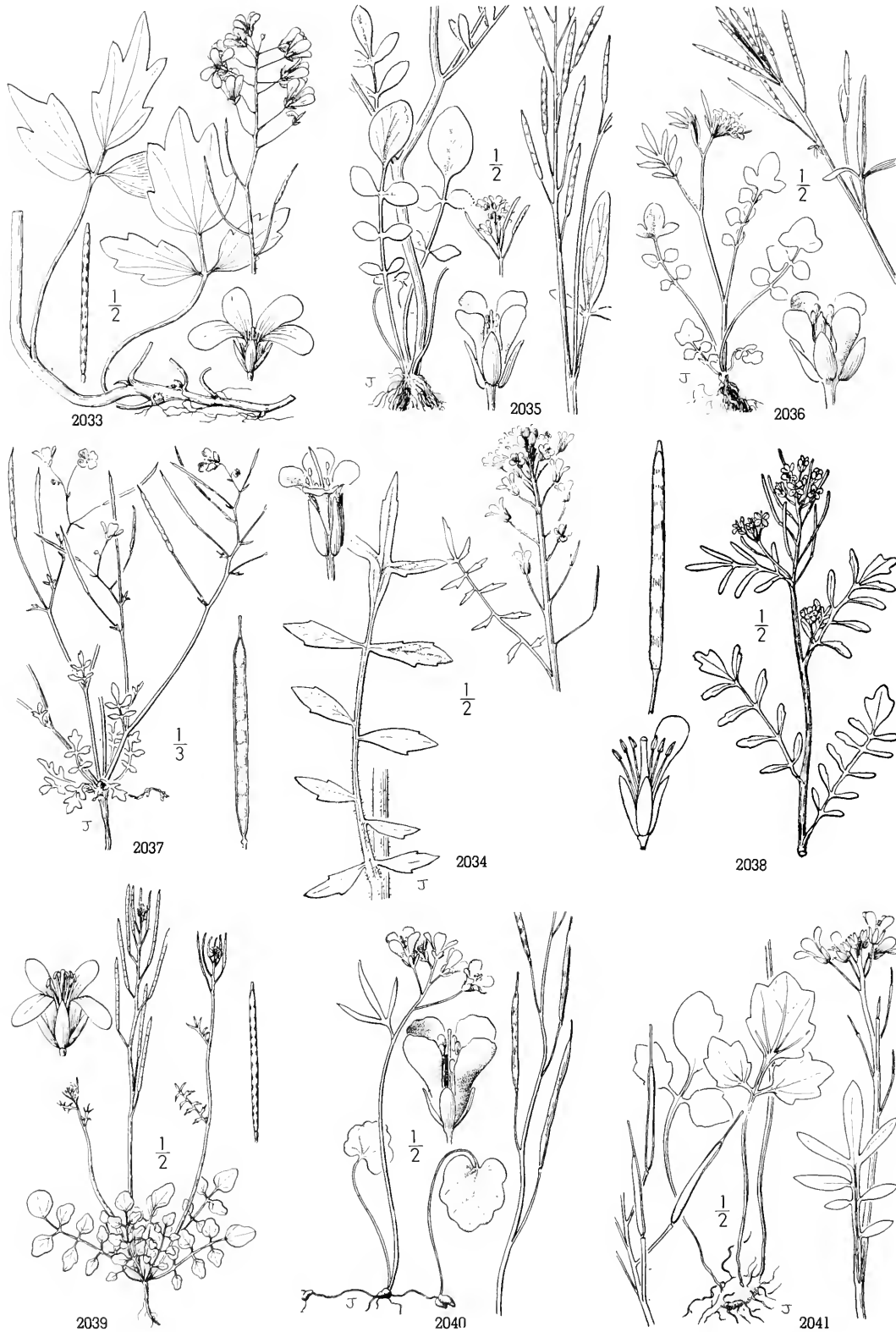
Idahoia scapigera A. Nels. & Macbr. Bot. Gaz. 56: 474. 1913.

Leaves rosulate, petioled, ovate, lyrate or sometimes entire; scapes several, 2–15 cm. high; sepals 2 mm. long, nearly equaling the spatulate petals; pod suborbicular, 6–10 mm. long, 8–12-seeded; seeds broadly winged, 5 mm. broad.

Mountain valleys in moist gravelly soils, Arid Transition Zone; eastern Washington and Idaho to north-eastern Nevada and Lassen and Santa Clara Counties, California. Type locality: moist rocks and in shallow soils, at the Celilo Falls, Columbia River. March–April.

30. *TROPIDOCÁRPUM* Hook. Ic. Pl. 1: pl. 43. 1836.

Slender, branching annuals, more or less hirsute with simple and forked hairs intermingling. Leaves pinnatifid; flowers small, in loose, leafy racemes. Sepals oblong, concave, equal at base, spreading. Petals yellow, spatulate-obovate. Stamens tetradynamous;



2033. *Cardamine angulata*
2034. *Cardamine Gambellii*
2035. *Cardamine occidentalis*

2036. *Cardamine umbellata*
2037. *Cardamine Pattersonii*
2038. *Cardamine pennsylvanica*

2039. *Cardamine oligosperma*
2040. *Dentaria tenella*
2041. *Dentaria gemmata*

anthers short, rounded. Style slender; stigma obscurely lobed. Silique 2-valved and partly or completely 2-celled or 4-valved and 1-celled. Seeds flattened, not winged; cotyledons incumbent. [Greek, meaning keeled fruit.]

Two species, natives of California. Type species, *Tropidocarpum gracile* Hook.

Pods strongly obcompressed, 2-valved.

1. *T. gracile*.

Pods more or less turgid, 4-valved.

2. *T. capparideum*.

1. *Tropidocarpum gracile* Hook. Slender *Tropidocarpum*. Fig. 2045.

Tropidocarpum gracile Hook. Ic. Pl. 1: pl. 43. 1836.

Tropidocarpum scabriusculum Hook. Ic. Pl. 1: pl. 52. 1836.

Tropidocarpum macrocarpum Hook. & Harv. ex Greene, Proc. Acad. Phila. 1895: 553. 1896.

Stems slender, erect or spreading, 15–45 cm. long, more or less hirsute-pubescent with intermingling simple and forked hairs. Leaves shallowly or deeply pinnatifid, the segments cleft or entire, those subtending the flowers reduced; pedicels slender, 6–20 mm. long; pods linear to linear-lanceolate, 1–3 cm. long or strongly obcompressed and 2-celled throughout.

Grassy plains and hillsides, Upper Sonoran Zone; North Coast Ranges and the Sacramento Valley, south to northern Lower California, extending eastward to Inyo County and the Mojave Desert. Type locality: Monterey, California. March–May.

Tropidocarpum gracile var. *dübium* (Davidson) Jepson, Man. Fl. Pl. Calif. 434. 1925. Differing from the typical species by the twisted pods which are 2-celled and obcompressed above the middle, by a twist becoming compressed below and 1-celled. San Joaquin Valley and southern California.

2. *Tropidocarpum capparideum* Greene. Caper-fruited *Tropidocarpum*. Fig. 2046.

Tropidocarpum capparideum Greene, Pittonia 1: 217. 1888.

Stems erect or decumbent, branching, pilose with intermingling forked and simple hairs. Leaves pinnatifid, the lobes simple or toothed, those subtending the flowers reduced; pedicels slender, equaling or exceeding the subtending leaflets; petals 3–4 mm. long, slightly exceeding the sepals; pods linear-oblong, 15–20 mm. long, turgid, 4-valved, 1-celled with 4 parietal placentae, the valves 1-nerved; style slender, 1–2 mm. long.

Alkaline soils, San Joaquin Valley, California. Type locality: "somewhat alkaline valley lands, skirting the San Joaquin River, Contra Costa County, California." March–April.

31. *LYROCÁRPA* Hook. & Harv. Lond. Journ. Bot. 4: 76. pl. 4. 1845.

Erect annual or perennial herbs with stellate pubescence. Leaves irregularly toothed or runcinate-pinnatifid. Racemes elongated in fruit. Sepals connivent, linear, acute. Petals ligulate or nearly so. Style short; stigma large, lobed. Pods lyrate or broadly reniform-obcordate, flattened contrary to the partition. Seeds strongly flattened and narrowly winged; cotyledons accumbent. [Greek, meaning lyre and fruit.]

Three species, natives of the arid southwestern United States and adjacent Mexico. Type species, *Lyrocarpa Coulteri* Hook. & Harv.

1. *Lyrocarpa Coulteri* Hook. & Harv. Coulter's Lyre-pod. Fig. 2047.

Lyrocarpa Coulteri Hook. & Harv. Lond. Journ. Bot. 4: 76. pl. 4. 1845.

Perennial with a short woody caudex, flowering stems several, more or less flexuous, 2–5 dm. long, whole plant cinereous with a more or less dense stellate pubescence. Leaves lanceolate in outline, toothed to pinnatifid, 3–7 cm. long; racemes loose, elongated in fruit; sepals 8 mm. long; petals about twice as long, ligulate, purplish yellow; pods lyrate, 10–15 mm. wide at the apex, 15–20 mm. long.

Dry rocky situations, Lower Sonoran Zone; Colorado Desert, southern California, to Sonora and northern Lower California. Type locality: California. Jan.–April.

32. *DITHÝREA* Harv. Lond. Journ. Bot. 4: 77. pl. 5. 1845.

Stellate-pubescent annuals or perennials, with branching stems. Flowers perfect, racemose. Sepals erect or connivent above, ovate or oblong, petals broadly spatulate, with slender claws, white or purplish. Stamens 6; anthers linear, sagittate. Stigma sessile, helmet-shaped. Pod didymous, strongly obcompressed, the cells suborbicular, with a prominent cord-like margin. Seeds solitary in each cell; cotyledons accumbent. [Greek, meaning two shields, in reference to the shape of the pods.]

A genus of two species, natives of the southwestern United States. Type species, *Dithyrea californica* Harv.

1. *Dithyrea californica* Harv. California Shield-pod. Fig. 2048.

Dithyrea californica Harv. Lond. Journ. Bot. 4: 77. 1845.

Biscutella californica Brewer & Wats. Bot. Calif. 1: 48. 1876.

Annual, the stems branching from the base, spreading or ascending, 1–4 dm. long. Leaves 2.5–7 cm. long, ovate to oblong-ovate, coarsely and shallowly few-toothed, the basal on petioles

nearly as long, the stem leaves smaller and sessile; racemes densely flowered; pedicels about 2 mm. long; sepals 5–6 mm. long, stellate-tomentose; petals much exceeding the sepals, white or purplish; pods notched both above and below, the thickened margin tomentose, the suborbicular cells 6–8 mm. broad.

Sandy soils in the deserts, Lower Sonoran Zone; Mohave and Colorado Deserts, southern California, and in adjacent Nevada, Arizona, and Mexico. Type locality: California. March–May. Also called Spectacle Pod.

Dithyrea californica var. *maritima* Davidson ex A. Gray, Syn. Fl. N. Amer. 1: 123. 1895. Leaves thicker, distinctly fleshy, mostly suborbicular, shallowly sinuate or entire, more densely canescent. Coast sand dunes from San Luis Obispo to Los Angeles County, California.

33. *PHYSARIA* A. Gray, Gen. Ill. 1: 162. 1848.

Stellate-pubescent, caespitose perennials, with a taproot. Flowers racemose, perfect, yellow. Petals spatulate. Stamens 6. Silicles dehiscent, inflated, didymous or obcompressed; styles slender. Seeds several in each cell, not margined; cotyledons accumbent. [Name Greek, meaning a bellows, from the resemblance of the inflated pod.]

A genus of four species, natives of western North America. Type species, *Physaria didymocarpa* A. Gray.

Pod much inflated at maturity, deeply cordate at base and apex.

1. *P. didymocarpa*.

Pod obcompressed, only slightly inflated, not cordate at base.

Style 5–6 mm. long; pod rather narrowed at base.

2. *P. Geyeri*.

Style 2–3 mm. long; pod rounded to slightly cordate at base.

3. *P. oregona*.

1. *Physaria didymocarpa* (Hook.) A. Gray. Double Bladder-pod. Fig. 2049.

Vesicaria didymocarpa Hook. Fl. Bor. Amer. 1: 49. pl. 16. 1830.

Physaria didymocarpa A. Gray, Gen. Ill. 1: 162. 1848.

Physaria alpestris Suksdorf, W. Amer. Sci. 15: 58. 1906.

Stems numerous, decumbent or erect, 3–15 cm. long. Basal leaves 1–8 cm. long, broadly obovate, entire or repand-toothed, finely and densely stellate-pubescent, narrowed to a margined petiole; petals 8–14 mm. long, spatulate; style 5–7 mm. long; pod 7–15 mm. broad, deeply cordate at the base, the upper sinus acute, narrow.

Sandy and rocky soils, Sonoran and Transition Zones; Saskatchewan and Alberta to eastern Oregon, Nevada, Utah, and Colorado. Type locality: "Growing in deep sand upon the Rocky Mountains, between lat. 52° and 57°." May–Aug.

Physaria didymocarpa var. *Newberryi* (A. Gray) M. E. Jones, Proc. Calif. Acad. II, 5: 624. 1895. Style 3–4 mm. long. Usually at lower elevations than the species. Southern Utah, Nevada, and adjacent California, east to New Mexico.

2. *Physaria Geyeri* (Hook.) A. Gray. Geyer's Double Bladder-pod. Fig. 2050.

Vesicaria Geyeri Hook. Lond. Journ. Bot. 6: 70. pl. 5. 1847.

Physaria Geyeri A. Gray, Gen. Ill. 1: 162. 1848.

Plants whitish with a densely stellate tomentum, the stems ascending or decumbent, 5–15 cm. long. Basal leaves 2–5 cm. long, obovate to nearly orbicular, narrowed to a margined petiole, repand-toothed or entire; racemes rather dense; petioles 8–12 mm. long, spatulate; pods broadly and shallowly obcordate, narrowed toward the base, 12–16 mm. wide.

Dry hillsides, especially in volcanic soils, Arid Transition Zone; eastern Washington to Montana and Wyoming. Type locality: "Sunny sandy declivities or elevated volcanic places, Upper Spokane River," Washington. May–Aug.

3. *Physaria oregona* S. Wats. Oregon Double Bladder-pod. Fig. 2051.

Physaria oregona S. Wats. Proc. Amer. Acad. 17: 363. 1882.

Plants canescent, the stellate pubescence not so white or dense as in the preceding species, the stems ascending or decumbent, 10–15 cm. long. Basal leaves ovate, obtuse or rounded, 15–20 mm. long, narrowed to a slender petiole 3–5 cm. long; pedicels mostly upwardly curved, 1 cm. long or more; sepals ovate-lanceolate to oblong-lanceolate, 5 mm. long, well exceeding the pale yellow petals; pod 12–16 mm. broad, rounded or very shallowly cordate at base; valves somewhat inflated, but narrowed dorsally to a keel; style about 1.5 mm. long.

Gravelly soils, Arid Transition and Sonoran Zones; southeastern Washington and northeastern Oregon. Type locality: "Gulches on Pine Creek, near Snake River, Union County, Oregon." May–Aug.

34. *LESQUERÉLLA* S. Wats. Proc. Amer. Acad. 23: 249. 1888.

Low annual or perennial herbs, with stellate pubescence, simple leaves, and racemose mainly yellow flowers. Sepals oblong to elliptical, shorter than the entire petals. Stamens 6; anthers sagittate. Style slender; stigma entire or nearly so. Pod generally inflated, subglobose or oblong; valves nerveless, dehiscent; septum suborbicular, nerved from the apex nearly to the middle. Seeds several to many in each cell, flattened, marginless or narrowly winged. [Name in honor of Leo Lesquereux, 1805–1889, Swiss and American botanist.]

A genus of about 35 species, natives of North America, and mainly the western United States. Type species, *Lesquerella occidentalis* S. Wats.

Pods globose or subglobose, not flattened at the apex or margin.

Annual, not rosette-forming, stems erect.

Perennials, rosette-forming, stems decumbent.

Basal leaves abruptly narrowed to the petiole.

Basal leaves gradually narrowed to the petiole.

Pods flattened at the apex and on the margin.

Caudex stout, slightly woody; flowering stems erect or decumbent.

Flowering stems prostrate or decumbent.

Flowering stems erect or ascending, 10–20 cm. long.

Caudex little developed, annual or short-lived perennial; flowering stems erect.

1. *L. Palmeri*.

2. *L. Kingii*.

3. *L. Douglasii*.

4. *L. diversifolia*.

5. *L. occidentalis*.

6. *L. Cusickii*.

1. *Lesquerella Palmeri* S. Wats. Palmer's *Lesquerella*. Fig. 2052.

Lesquerella Palmeri S. Wats. Proc. Amer. Acad. 23: 255. 1888.

Lesquerella Gordonii var. *sessilis* S. Wats. Proc. Amer. Acad. 23: 253. 1888.

Lesquerella tenella A. Nels. Bot. Gaz. 47: 426. 1909.

Annual, finely stellate, the stems slender, decumbent or ascending, usually branched, 1–4 dm. long. Basal leaves 1–5 cm. long, entire or few-lobed, narrowed to a slender petiole; stem leaves narrowly oblong-lanceolate, entire, 1–3 cm. long; petals yellow, broadly spatulate; fruiting pedicels ascending to recurved, usually sigmoid, 8–20 mm. long; pods globose or slightly elongated, 3–5 mm. broad, sparsely stellate; seeds not winged.

Sandy soils, Lower Sonoran Zone; southern Nevada and Utah south to Arizona, the California deserts, and northern Lower California. Type locality: Arizona. March–May.

2. *Lesquerella Kingii* S. Wats. King's *Lesquerella*. Fig. 2053.

Lesquerella Kingii S. Wats. Proc. Amer. Acad. 23: 251. 1888.

Perennial, flowering stems several, decumbent, 1–2 dm. long, ovate to rounded, entire, narrowed to a petiole which exceeds it in length, stem leaves oblanceolate, 2 cm. long or less; flowers 6–7 mm. long, style 3–5 mm. long; fruiting raceme elongated; pedicels sigmoid; pods subglobose, not compressed, 3–5 mm. long, sparingly stellate.

Desert ranges, Upper Sonoran Zone; western Nevada and the Panamint and White Mountains, California. Type locality: West Humboldt Mountains, Nevada. May–June.

Lesquerella bernardina Munz, Bull. S. Calif. Acad. 31: 62. 1932. Characterized by longer petals, 9 mm long, and longer style, 7–9 mm. long. Local in the San Bernardino Mountains, California.

3. *Lesquerella Douglasii* S. Wats. Douglas' *Lesquerella*. Fig. 2054.

Lesquerella Douglasii S. Wats. Proc. Amer. Acad. 23: 255. 1888.

Perennial, silvery stellate throughout, flowering stems few to many from the short usually simple caudex, decumbent or ascending, 10–45 cm. long. Basal leaves obovate to oblanceolate, tapering to a slender petiole, entire or few-toothed; stem leaves linear to narrowly oblanceolate, 1–3.5 cm. long; petals yellow, narrowly spatulate, 6–9 mm. long; fruiting pedicels 7–15 mm. long, straight or sigmoid; pods subglobose, stellate, 3–4 mm. broad; seeds wingless.

Sandy or gravelly soils, Upper Sonoran Zone; southeastern British Columbia through eastern Washington to the Columbia River in eastern Oregon. Type locality: originally collected by Douglas, without locality. May–July.

4. *Lesquerella diversifolia* Greene. Wallowa *Lesquerella*. Fig. 2055.

Lesquerella diversifolia Greene, Pittonia 4: 309. 1901.

Perennial, with a stout caudex clothed with the persistent leaf bases of the previous year, densely stellate-pubescent throughout; stems usually prostrate, 4–10 cm. long, simple. Basal leaves 2–6 cm. long, the blade ovate to nearly orbicular, obtuse, usually abruptly narrowed to the petiole; stem leaves few, narrowly oblanceolate; petals yellow, 7 mm. long; pedicels 5–10 mm. long; pods densely stellate-pubescent, 4–6 mm. long; ovules 2 in each cell.

Exposed mountain slopes, Boreal Zones; Wallowa and Steens Mountains, eastern Oregon, to central Idaho. Type locality: Wallowa Mountains, alt. 7,000 feet. June–Aug.

5. *Lesquerella occidentalis* S. Wats. Western *Lesquerella*. Fig. 2056.

Vesicaria occidentalis S. Wats. Proc. Amer. Acad. 20: 353. 1885.

Lesquerella occidentalis S. Wats. Proc. Amer. Acad. 23: 251. 1888.

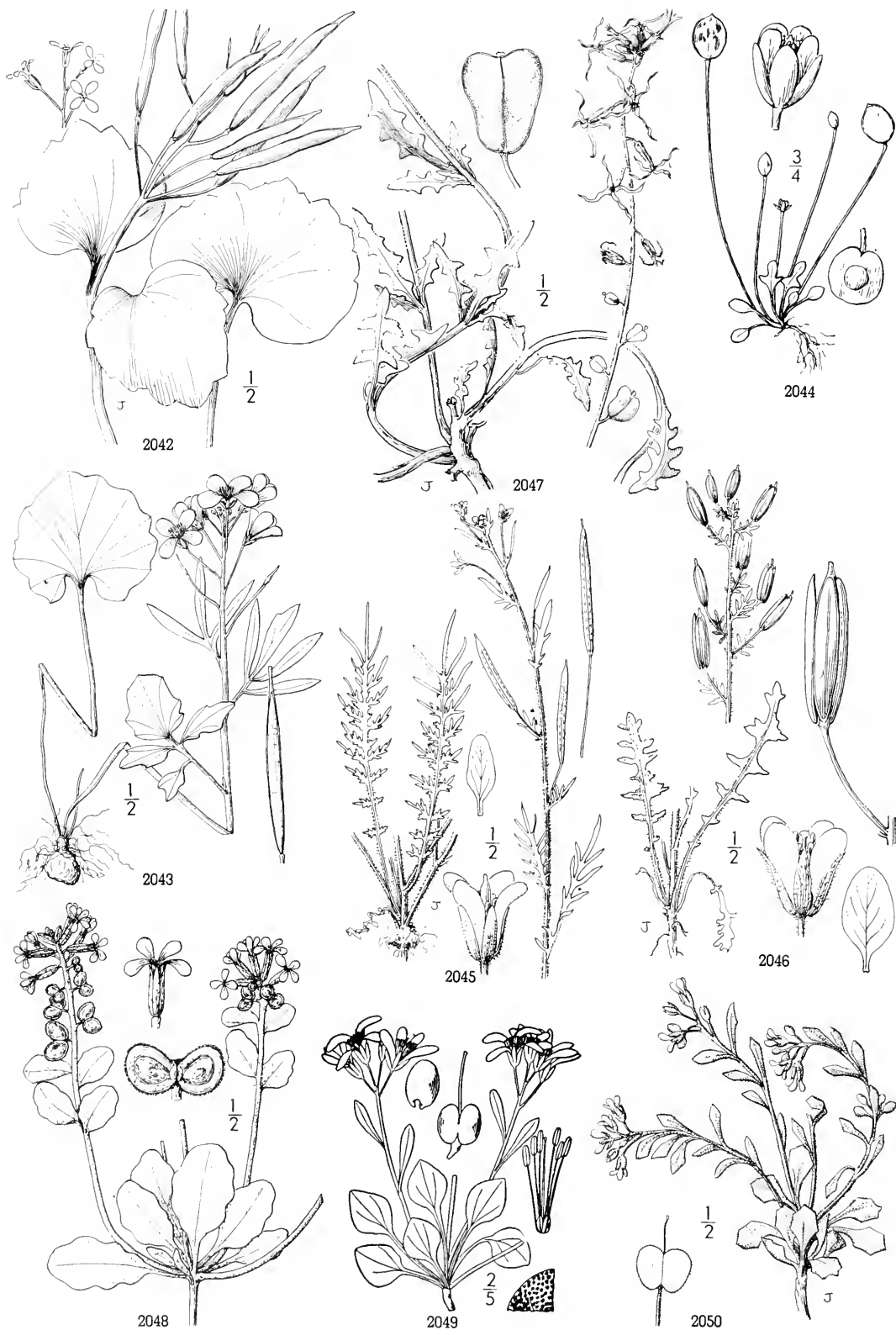
Perennial, silvery stellate, the flowering stems numerous from the short woody caudex, decumbent or ascending, 5–20 cm. long. Basal leaves 2–7 cm. long, the blade broadly ovate to lanceolate, tapering to the slender, elongated petiole, entire or repand; stem leaves oblanceolate, 1–1.5 cm. long, entire; petals yellow, narrowly spatulate, 9–10 mm. long; filaments linear; fruiting pedicels strongly sigmoid, 8–15 mm. long; pods densely stellate, obovoid, compressed at the apex and along the margin, 4–6 mm. long.

Rocky hillsides, Boreal Zones; Siskiyou Mountains and northern Sierra Nevada, California. Type locality: near Yreka, California. May–July.

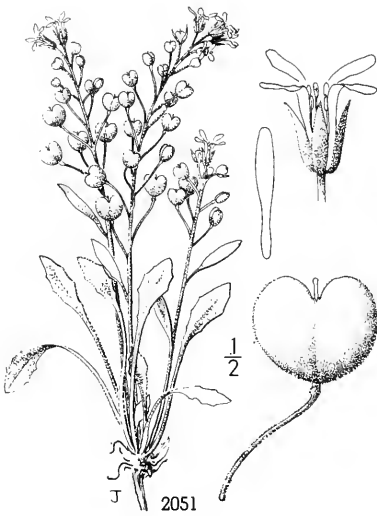
6. *Lesquerella Cusickii* M. E. Jones. Cusick's *Lesquerella*. Fig. 2057.

Lesquerella Cusickii M. E. Jones, Contr. West. Bot. No. 12: 2. 1908.

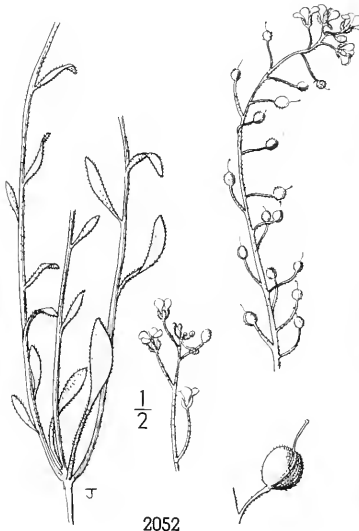
Annual or short-lived perennial, densely stellate, the flowering stems numerous, unbranched, 4–20 cm. long. Basal leaves 2–6 cm. long, the blade oblanceolate to rounded, entire or repand,



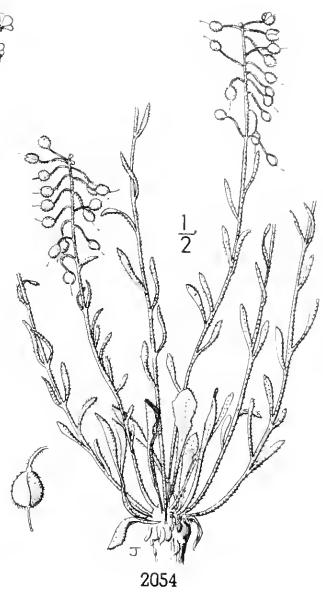
2042. *Dentaria pachystigma*
2043. *Dentaria californica*
2044. *Idahoia scapigera*
2045. *Tropidocarpum gracile*
2046. *Tropidocarpum capparideum*
2047. *Lyrocarpa Coulteri*
2048. *Dithyrea californica*
2049. *Physaria didymocarpa*
2050. *Physaria Geyeri*



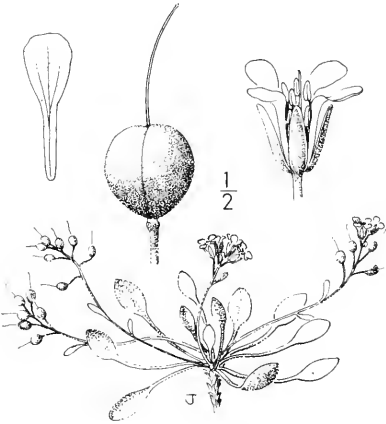
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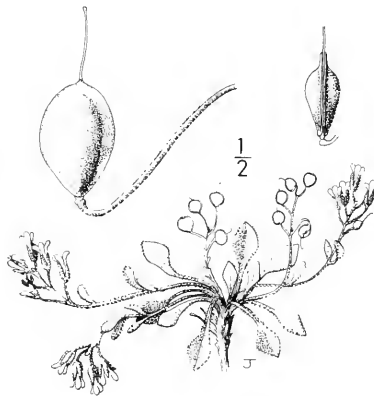
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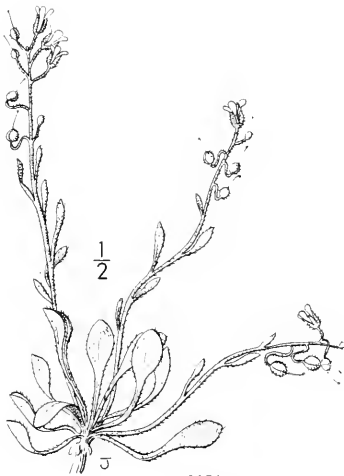
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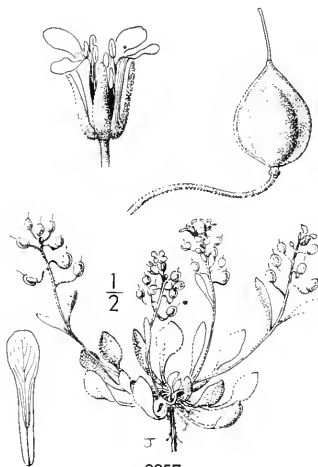
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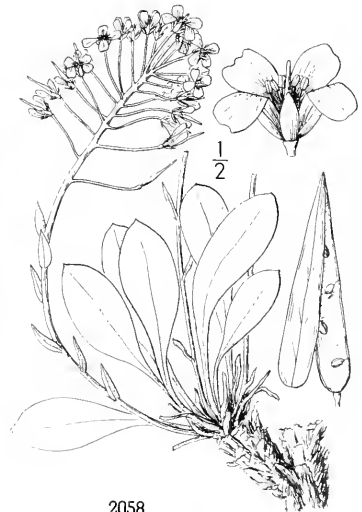
2059



2056



2057



2058

2051. *Physaria oregona*
2052. *Lesquerella Palmeri*
2053. *Lesquerella Kingii*

2054. *Lesquerella Douglasii*
2055. *Lesquerella diversifolia*
2056. *Lesquerella occidentalis*

2057. *Lesquerella Cusickii*
2058. *Phoenicaulis cheiranthoides*
2059. *Phoenicaulis eurycarpa*

about equaled by the petiole; stem leaves 10–25 mm. long, oblanceolate, entire or repand; fruiting racemes elongated; pedicels conspicuously sigmoid, 6–15 mm. long; pods 4–6 mm. long, obovoid, somewhat compressed parallel with the partition, densely stellate.

White clay soils, Upper Sonoran Zone; eastern Oregon, Gilliam County to Malheur County. Type locality: white clay soils, Willow Creek, Malheur County, Oregon. May–June.

35. *PHOENICAULIS* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 89. 1838.

Acaulescent perennial herbs, with a branched, leafy caudex, the flowers borne on short scapose stems. Sepals oblong, erect, the lateral gibbous at base. Petals purple or pink, with long claws and broad blades. Anthers included, sagittate at base. Pods flattened parallel with the partition, the valves 1-nerved; stigma entire; seeds marginless, cotyledons obliquely accumbent. [Name Greek, meaning purple stem. Thought by some to be a misprint for *Phaenocaulis*, meaning a flower stem.]

Two species native of western North America. Type species, *Phoenicaulis cheiranthoides* Nutt.

Pods linear-lanceolate; racemes 10–15 cm. long.
Pods ovate-lanceolate; racemes 2–3 cm. long.

1. *P. cheiranthoides*.
2. *P. eurycarpa*.

1. *Phoenicaulis cheiranthoides* Nutt. Common *Phoenicaulis*. Fig. 2058.

Phoenicaulis cheiranthoides Nutt. in Torr. & Gray, Fl. N. Amer. 1: 89. 1838.

Hesperis Menziesii Hook. Bot. Beechey 322. pl. 75, as to description and plate, but not synonymic type. 1838.

Phoenicaulis Menziesii Steudel, Nom. ed. 2. 2: 323, in part, not as to synonymic type. 1841.

Phaenocaulis Menziesii Greene, Bull. Torrey Club 13: 143, in part. 1886. Not *Hesperis Menziesii* Hook. 1830.

Parrya Menziesii Greene, Fl. Fran. 253, in part, not as to synonymic type. 1891.

Caudex stout, the branches few, covered with the remains of dead leaves, the scapose flowering stems 6–15 cm. long, nearly glabrous. Leaves 2.5–10 cm. long, spatulate to oblanceolate, acute or obtuse, entire, densely tomentose on both sides with fine stellate pubescence, the petioles often nearly glabrous; raceme many-flowered; petals about 8 mm. long; pedicels 10–15 mm. long, divaricate; pods 2–4 cm. long, horizontal, narrowed from near the base to the slender style, glabrous, 2–4-seeded.

Rocky soils, Boreal and Transition Zones; eastern Washington and Idaho to western Nevada, the Sierra Nevada and North Coast Ranges, California. Type locality: "high hills to the east of Wallawallah River, and on rocks on the upper part of the Oregon." April–June.

Phoenicaulis cheiranthoides subsp. *lanuginosa* (S. Wats.) Abrams. (*Parrya Menziesii* var. *lanuginosa* S. Wats. in A. Gray, Syn. Fl. N. Amer. 1: 152. 1895.) Distinguished from the typical species by the more loose and woolly pubescence. Eastern Oregon to northwestern Nevada and the northern Sierra Nevada, California.

Phoenicaulis cheiranthoides subsp. *glabra* (Jepson) Abrams. (*Parrya Menziesii* var. *glabra* Jepson, Man. Fl. Pl. Calif. 434. 1925.) This subspecies is distinguished by the entirely glabrous herbage. Lake City Mountain, Modoc County, California.

2. *Phoenicaulis eurycarpa* (A. Gray) Abrams. Broad-podded *Phoenicaulis*. Fig. 2059.

Draba eurycarpa A. Gray, Proc. Amer. Acad. 6: 520. 1865.

Anelsonia eurycarpa Macbr. & Payson, Bot. Gaz. 64: 81. 1917.

Parrya Huddelliana A. Nels. Bot. Gaz. 54: 139. 1912.

Parrya eurycarpa Jepson, Man. Fl. Pl. Calif. 434. 1925.

Densely caespitose, branches of the caudex short. Leaves numerous, oblanceolate, 10–15 mm. long, densely stellate; scape scarcely exceeding the leaves, pubescent; petals yellow; pod oblong-ovoid, acute, glabrous, style 2 mm. long.

Alpine slopes, Boreal Zones; Idaho to Nevada and the Sierra Nevada, California. Type locality: "Near summit of peak south of Sonora Pass, California, at 11,500 feet altitude." June–Aug.

36. *HUTCHINSIA* R. Br. in Ait. Hort. Kew. ed. 2. 4: 82. 1812.

Low mostly diffuse annual or perennial herbs, more or less pubescent with forked hairs. Leaves entire or pinnately lobed. Flowers white, minute, in terminal racemes. Stamens 6. Style none or very short. Silicles oval, compressed at right angles to the septum, the valves strongly 1-nerved. Seeds numerous in each cell; cotyledons incumbent or accumbent. [Name in honor of Miss Hutchins, of Bantry, Ireland, a prominent botanist.]

A genus of about 8 species, natives of the northern hemisphere, only the following in North America. Type species, *Hutchinsia petraea* (Willd.) R. Br.

1. *Hutchinsia procumbens* (L.) Desv. Prostrate *Hutchinsia*. Fig. 2060.

Lepidium procumbens L. Sp. Pl. 643. 1753.

Hutchinsia procumbens Desv. Journ. Bot. 3: 168. 1814.

Hymenolobus divaricatus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 117. 1838.

Capsella elliptica C. A. Meyer ex Ledeb. Fl. Alt. 3: 199. 1831.

Stems branching from the base, slender, ascending or procumbent, 5–20 cm. long. Lower

leaves short-petioled, pinnatifid, lobed or toothed, or sometimes entire, 10–25 mm. long; upper leaves sessile or nearly so, entire or lobed; pedicels slender, ascending or spreading, 6–12 mm. long in fruit; pods elliptical or oval, obtuse, rarely emarginate, 3–4 mm. long.

In moist saline places, Boreal and Austral Zones; British Columbia to southern California, extending to Labrador; also in Europe, Asia, and Australia. Type locality: Montpellier, France. March–June.

37. *CAPSÉLLA* Medic. Pflanzeng. 1: 85. 1792.

Erect annual herbs pubescent with forked hairs, the basal leaves tufted. Flowers racemose, small, white. Silicles cuneate, obcordate or triangular, compressed at right angles to the septum, the valves boat-shaped, keeled. Style short. Seeds numerous in each cell, marginless; cotyledons accumbent. [Name Latin, meaning a little box.]

About 4 species, natives of the northern hemisphere. Type species, *Capsella Bursa-pastoris* (L.) Medic.

1. *Capsella Bursa-pastoris* (L.) Medic. Shepherd's Purse. Fig. 2061.

Thlaspi Bursa-pastoris L. Sp. Pl. 647. 1753.

Bursa pastoris Weber in Wigg. Prim Fl. Holst. 47. 1780.

Capsella Bursa-pastoris Medic. Pflanzeng. 1: 85. 1792.

Bursa Bursa-pastoris Britt. Mem. Torrey Club 5: 172. 1894.

Stems erect, branching, 15–40 cm. high, pubescent below, mostly glabrous above. Basal leaves lobed or pinnatifid, forming a rosette, 5–12 cm. long; stem leaves few, lanceolate, auricled, dentate or entire; pedicels slender, spreading or ascending, 10–15 mm. long; flowers white, about 2 mm. broad; pods triangular, more or less emarginate at the apex, 4–6 mm. long.

A cosmopolitan weed, very common in gardens and waste places, naturalized from Europe. Jan.–Dec.

38. *CAMELINA* Crantz, Stirp. Aust. 1: 18. 1762.

Erect annual herbs, with entire, toothed or pinnatifid leaves, and small yellowish flowers in terminal racemes. Stamens 6, styles slender. Silicles obovoid or pear-shaped, slightly flattened parallel to the partition; valves strongly convex, 1-nerved. Seeds several to many in each cell, arranged in 2 rows, oblong, marginless; cotyledons incumbent. [Name Greek, meaning low flax.]

About 5 species, natives of Europe and Asia. Type species, *Camelina sativa* (L.) Crantz.

Plants glabrous, or nearly so; pod 6–8 mm. long.

1. *C. sativa*.

Plants pubescent at least below; pod 4–5 mm. long.

2. *C. microcarpa*.

1. *Camelina sativa* (L.) Crantz. False or Dutch Flax. Fig. 2062.

Myagrum sativum L. Sp. Pl. 641. 1753.

Camelina sativa Crantz, Stirp. Aust. 1: 18. 1762.

Plants glabrous or nearly so, the stems simple or branching above, 3–8 dm. high. Basal leaves petioled, 5–8 cm. long, lanceolate, acutish, toothed or entire; the upper sessile, clasping by a sagittate base, smaller, mostly entire; racemes many-flowered; pedicels slender, spreading, 15–20 mm. long; pod obovoid or pear-shaped, margined, 6–8 mm. long.

Sparingly introduced in western Washington and Oregon. Native of Europe. June–July.

2. *Camelina microcarpa* Andrz. Small-fruit False Flax. Fig. 2063.

Camelina microcarpa Andrz. ex DC. Syst. 2: 517. 1821.

Stems hirsute below, erect, simple or with a few elongated branches, 3–9 dm. high. Leaves sessile and auricled or the lower narrowed at base, entire or nearly so, stellate-pubescent; fruiting raceme often 20–30 cm. long; pedicels usually less than 15 mm. long; pod 4–5 mm. long, strongly margined.

Sparingly introduced in western Washington and Oregon. Native of Europe and closely related to the preceding species. May–July.

39. *NÉSILIA* Desv. Journ. Bot. 3: 162. 1814.

Hispid annual, with erect, branching, leafy stems, and entire leaves. Flowers small, yellow, racemose. Silicles small, globose, wingless, reticulated, 1-celled, 1–2-seeded, indehiscent; style filiform. Seed horizontal; cotyledons incumbent. [Name in honor of the French botanist J. A. N. de Nesle.]

A monotypic genus of Europe and eastern Asia.

1. *Neslia paniculata* (L.) Desv. Ball Mustard. Fig. 2064.

Myagrum paniculatum L. Sp. Pl. 641. 1753.

Neslia paniculata Desv. Journ. Bot. 3: 162. 1814.

Stems slender, branched above, rough-hispid with forked hairs, 3–6 dm. high. Leaves lanceolate or the upper linear-lanceolate, sagittate-clasping, 2.5–6 cm. long; racemes elongated; petals yellow, 2 mm. long; pedicels filiform, ascending, 6–10 mm. long; pods subglobose, about 2 mm. in diameter, finely reticulated.

In moist places, native of Europe; sparingly naturalized in Washington and British Columbia. May–Sept.

40. *DRABA* [Dill.] L. Sp. Pl. 642. 1753.

Low tufted mostly stellate-pubescent herbs, with scapose or leafy stems, simple leaves, and racemose flowers. Silicles elliptical, oblong or rarely linear, flat, few- to many-seeded. Stigma nearly entire. Seeds numerous, arranged in 2 rows in each cell, winged or wingless; valves dehiscent, nerveless; cotyledons accumbent. [Greek name for some member of the family.]

About 175 species, mainly of the north temperate and arctic regions, a few in southern South America. Type species, *Draba verna* L.

Annuals.

- Petals bifid. 1. *D. verna*.
- Petals entire or merely emarginate.
- Flowers white, dimorphous, the smaller ones cleistogamous.
- Fruiting racemes short and compact; leaves basal. 2. *D. reptans*.
- Fruiting racemes elongated and open.
- Pods ellipsoid, rounded at apex, coarsely pubescent with upwardly appressed and rather stiff simple hairs. 3. *D. platycarpa*.
- Pods oblong, obtuse at the apex, stellate-pubescent or glabrous. 4. *D. sonorae*.
- Flowers yellow, not dimorphous.
- Pods 2-4 mm. long, the pedicels scarcely as long; petals sometimes wanting. 5. *D. brachycarpa*.
- Pods 5-15 mm. long; petals always present.
- Pods 5-8 mm. long; pedicels usually much longer. 6. *D. nemorosa*.
- Pods 10-15 mm. long; pedicels usually shorter. 7. *D. stenoloba*.

Perennials.

- Flowering stems scapose.
- Style none; pods linear, 10-15 mm. long. 8. *D. lonchocarpa*.
- Style evident, 0.5-3 mm. long.
- Pods strongly flattened; style stout, 0.5-1 mm. long.
- Leaves oblanceolate or obovate, not firm and midvein not prominent.
- Leaves densely stellate-pubescent, without cilia, obovate; seeds not winged.
- Pedicels very short, scarcely evident in anthesis. 9. *D. ruaxes*.
- Pedicels slender, mostly 4-6 mm. long in anthesis. 10. *D. Cusickii*.
- Leaves ciliate on the margins, rather obscurely so in *incerta*, oblanceolate.
- Leaves loosely stellate, the margins weakly ciliate toward the base.
- Seeds broadly winged all around or only at apex. 11. *D. Howellii*.
- Seeds not winged. 12. *D. incerta*.
- Leaves strongly ciliate on the margins, otherwise glabrous or with a few simple hairs. 13. *D. Lemmonii*.
- Leaves linear or linear-oblong, firm, midvein prominent, conspicuously ciliate.
- Leaves over 5 mm. long, not incurved; scapes usually over 3 cm. long.
- Leaves loosely stellate-pubescent, ciliate to the apex. 14. *D. Paysonii*.
- Leaves strongly ciliate on the margins, otherwise glabrous or with a few stellate hairs toward the apex. 15. *D. Nelsonii*.
- Leaves not over 5 mm. long, closely imbricated and often incurved at apex.
- Leaves glabrous except for prominent marginal cilia. 16. *D. sphaerula*.
- Leaves pubescent.
- Pubescence of short appressed stellate hairs. 17. *D. subsessilis*.
- Pubescence short-villous with forked and simple hairs. 18. *D. novolympica*.
- Pods subovoid; style very slender, 1.5-2.5 mm. long; flowers white. 19. *D. Douglasii*.
- Flowering stems leafy.
- Styles not evident. 20. *D. Breweri*.
- Styles 1-3 mm. long.
- Style stout, 1-3 mm. long; pods usually obtuse at the apex. 21. *D. aureola*.
- Style almost filiform, 2-3 mm. long; pod very acute at apex. 22. *D. corrugata*.

1. *Draba verna* L. Vernal Whitlow-grass. Fig. 2065.

Draba verna L. Sp. Pl. 642. 1753.

Erophila vulgaris DC. Syst. 2: 356. 1821.

Annual or biennial, with tufted basal leaves and several to many ascending or erect leafless and nearly glabrous scapes, 5-15 cm. high. Leaves 15-25 mm. long, oblong or spatulate-oblanceolate, denticulate or nearly entire, pubescent with stiff stellate hairs; petals white, 3-4 mm. long, deeply bifid; pods oblong or oval, 6-8 mm. long, glabrous; pedicels ascending, 15-25 mm. long in fruit.

A variable species, naturalized from Europe, occurring in the eastern United States and on the Pacific Slope from British Columbia to northern California. Feb.-May.

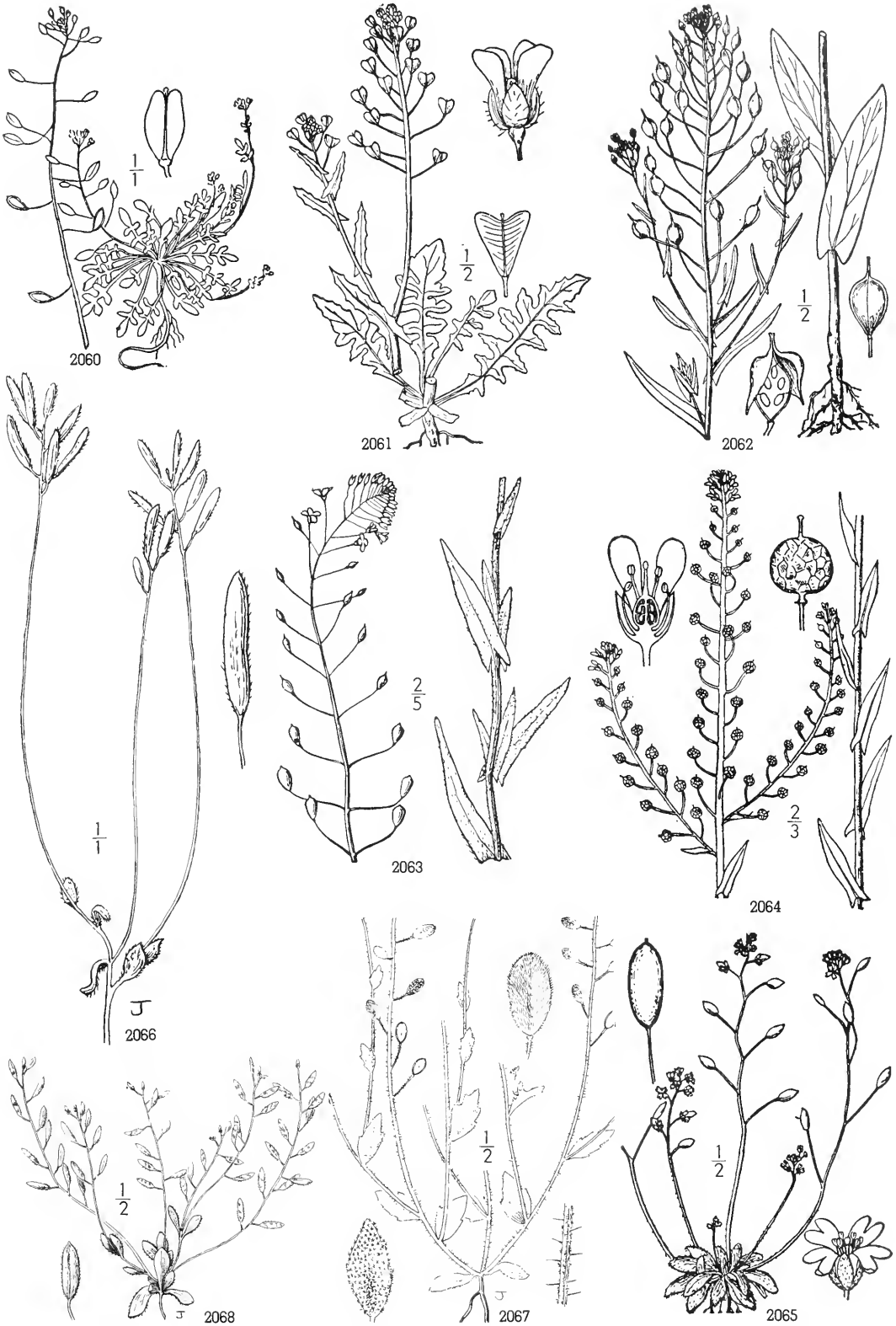
2. *Draba réptans* (Lam.) Fernald. Carolina Whitlow-grass. Fig. 2066.

Arabis reptans Lam. Encyl. 1: 222. 1783.

Draba caroliniana Walt. Fl. Car. 174. 1788.

Draba reptans Fernald, Rhodora 36: 368. 1934.

Annual, the stems branched from the base, 5-10 cm. high, more or less pubescent. Leaves 5-15 mm. long, ovate to elliptical, entire, stellate-pubescent; petals emarginate, usually shorter than the sepals, sometimes wanting in older racemes; fruiting racemes congested at the ends of



2060. *Hutchinsia procumbens*
 2061. *Capsella Bursa-pastoris*
 2062. *Camelina sativa*

2063. *Camelina microcarpa*
 2064. *Neslia paniculata*
 2065. *Draba verna*

2066. *Draba reptans*
 2067. *Draba platycarpa*
 2068. *Draba sonorae*

the slender scape-like peduncles; pedicels ascending, shorter than or about equaling the pods; pods 6–12 mm. long, 3–4 mm. wide, glabrous.

Dry hillsides and plains. Arid Transition and Upper Sonoran Zones; eastern Washington and Oregon to Colorado, Ontario, and the Atlantic States. March–May.

Draba reptans var. *micrantha* (Nutt.) Fernald, *Rhodora* 36: 368. 1934. Pods hispid with short simple hairs. Eastern Washington to southern California, Illinois, and Louisiana.

Draba reptans subsp. *stellifera* (O. E. Schulz) Abrams. (*Draba caroliniana* var. *micrantha* f. *stellifera* O. E. Schulz, *Pflanzenreich* 4¹⁰⁶: 333. 1927. *D. caroliniana* subsp. *stellifera* Payson & St. John, *Proc. Biol. Soc. Wash.* 43: 103. 1930.) This subspecies differs from the species in the densely stellate upper surfaces of the leaves and in the hispidulous pods. Dry rocky or sandy slopes, eastern Washington to Idaho and the desert ranges, southern California.

3. *Draba platycarpa* Nutt. Broad-podded Whitlow-grass. Fig. 2067.

Draba platycarpa Nutt. in Torr. & Gray, *Fl. N. Amer.* 1: 108. 1838.

Draba Roemeriana Scheele, *Linnaea* 21: 256. 1888.

Draba viperensis St. John, *Proc. Biol. Soc. Wash.* 43: 104. 1930.

Annual, branching from the base, the stems 15–25 cm. high, pilose with simple and stellate hairs. Basal leaves oblanceolate, 15–25 mm. long, entire or few-toothed, obtuse at the apex, stellate-pubescent above; stem leaves lanceolate to narrowly ovate; racemes becoming lax and elongated in fruit, 10–15 cm. long; petals white, 3 mm. long; fruiting pedicels divergent, 3–8 mm. long; pod elliptic to obovate, strongly compressed, 6–8 mm. long, rounded at apex, hispidulous with upwardly appressed hairs.

Open ground and rocky hillsides, Sonoran Zones; eastern Washington, eastern Oregon, and Idaho, to Arizona and Texas. Type locality: Texas. April–May.

4. *Draba sonorae* Greene. Sonora Draba. Fig. 2068.

Draba sonorae Greene, *Bull. Calif. Acad.* 2: 59. 1886.

Draba cuneifolia var. *sonorae* Parish, *Bull. S. Calif. Acad.* 2: 81. 1903.

Low winter annual, the stems erect or ascending, branching near the base, leafy below, 8–15 cm. high. Basal leaves obovate to oblanceolate, cuneate at base, 10–20 mm. long, entire or few-toothed, stellate on both surfaces; petals white, 2 mm. long; fruiting racemes 3–10 cm. long; pedicels spreading, 3–4 mm. long; pods oblong-elliptical, 6–9 mm. long, 2.5 mm. wide, stellate.

Sandy or gravelly soil, Sonoran Zones; southern California to Arizona, Lower California, and Sonora. Type locality: northwestern Sonora. Feb.–May.

Draba sonorae var. *integrifolia* (S. Wats.) O. E. Schulz, *Pflanzenreich* 4¹⁰⁵: 336. 1927. Closely resembling the typical species, but the pods nearly or quite glabrous. Southern California.

5. *Draba brachycarpa* Nutt. Short-fruited Whitlow-grass. Fig. 2069.

Draba brachycarpa Nutt. in Torr. & Gray, *Fl. N. Amer.* 1: 108. 1838.

Low tufted annual, 5–12 cm. high, leafy to the inflorescence and loosely stellate-pubescent. Basal leaves ovate or obovate, 8–12 mm. long, obtuse, entire or sparingly denticulate; stem leaves smaller, sessile, entire; sepals somewhat shorter than the petals; petals yellow or whitish, 2 mm. long, sometimes wanting; fruiting pedicels ascending, 2–4 mm. long; pods oblong, acute, 3–4 mm. long, 1 mm. wide; style minute.

Dry hills and fields, Transition and Upper Sonoran Zones; Oregon, Montana, and Colorado to Illinois, Virginia, Georgia, and Arkansas. Type locality: plains and open places, near St. Louis. March–May.

6. *Draba nemorosa* L. Wood Whitlow-grass. Fig. 2070.

Draba nemorosa L. *Sp. Pl.* 643. 1753.

Loosely stellate-pubescent winter annual, 15–30 cm. high, branching below, leafy to the inflorescence. Leaves oblong-ovate or lanceolate, sessile, obtuse, dentate, the lower 20–25 mm. long, the upper smaller; petals light yellow, 2–3 mm. long; fruiting pedicels divaricate, 1–2 cm. long; pods oblong, 5–10 mm. long, 2 mm. wide.

Woods and thickets, Boreal and Transition Zones; British Columbia to northern California, east to Colorado, Michigan, and Ontario; also in northern Europe and Asia. Type locality: in Europe. April–June.

Draba nemorosa var. *leiocarpa* Lindbl. *Linnaea* 13: 33. 1839. (*D. lutea* Gilib.) Pods glabrous. Boreal and Transition Zones; Alaska to eastern Oregon, Hudson Bay, Colorado, and Michigan; also Eurasia.

7. *Draba stenoloba* Ledeb. Alaska Whitlow-grass. Fig. 2071.

Draba stenoloba Ledeb. *Fl. Ross.* 1: 154. 1841.

Draba nitida Greene, *Pl. Baker.* 3: 7. 1901.

Winter annual, usually branched from the base, 1–3 dm. high. Basal leaves rosulate, oblanceolate, 1–3 cm. long, nearly glabrous above, densely stellate beneath; stem leaves few, oblong or lanceolate, usually entire; petals yellow, about 2 mm. long; fruiting pedicels ascending, 6–15 mm. long; pod linear-oblong, 8–15 mm. long, 2 mm. wide, erect, glabrous.

Boreal Zones; Alaska and Alberta to the Sierra Nevada, California, and Colorado. Type locality: Unalak. May–Aug.

8. *Draba lonchocarpa* Rydb. Lance-podded Draba. Fig. 2072.

Draba lonchocarpa Rydb. *Mem. N.Y. Bot. Gard.* 1: 181. 1900.

Draba nivalis var. *clongata* S. Wats. *Proc. Amer. Acad.* 23: 258. 1886.

Cespitose perennial. Basal leaves spatulate, 3–5 mm. long, densely stellate; stem leaves 1 or

2; flowering stems pubescent, 4–6 cm. high; racemes becoming about 2.5 cm. long, 4–6-flowered; petals white, 2–2.5 mm. long; pod linear, 10–15 mm. long, straight or twisted.

Moist places, Boreal Zones; Cascade Mountains, British Columbia and Washington, east to Alberta and Montana. Type locality: McDonald's Peak, Montana. July–Aug.

9. *Draba ruáxes* Payson & St. John. Volcano Draba. Fig. 2073.

Draba ruaxes Payson & St. John, Proc. Biol. Soc. Wash. 43: 117. 1930.

Cespitose perennial, subterranean branches freely branching. Leaves crowded, broadly oblanceolate to suborbicular, 5–7 mm. long, spreading, densely pubescent with simple and forked hairs, sparsely ciliate toward the base; scapes slender, 2–4 cm. high; racemes short, compact, few-flowered; petals yellow, broadly emarginate, 3 mm. long; pedicels stout, 1–2 mm. long; pods ovate-elliptic, 5–6 mm. long, pubescent with simple hairs; style stout, 0.5 mm. long.

Rocky slopes, Arctic-Alpine Zone; Coast Ranges of British Columbia to Glacier Peak, Cascade Mountains, Washington. Type locality: crevices of disintegrating flaky andesite, north side of Glacier Peak, Snohomish County, Washington. July–Aug.

10. *Draba Cusíckii* Robinson. Cusick's Draba. Fig. 2074.

Draba Cusickii Robinson ex O. E. Schulz, Pflanzenreich 4105: 105. 1927.

Cespitose perennial, branches of the caudex slender. Leaves oblong-obovate, pubescent with stipitate 2-forked hairs, ciliate on the margins; scapes 8–12 cm. long including the lax raceme, minutely stellate; petals yellow, 4.5 mm. long; pods oblong-ellipsoid, compressed, 6–10 mm. long; style slender, about 1 mm. long; seeds wingless.

Boreal Zones; southeastern Oregon and adjacent Nevada. Type locality: Steens Mountains, Oregon. June–Aug.

11. *Draba Howéllii* S. Wats. Howell's Draba. Fig. 2075.

Draba Howellii S. Wats. Proc. Amer. Acad. 20: 354. 1885.

Draba pterosperma Payson, Amer. Journ. Bot. 4: 266. 1917.

Draba carnosula O. E. Schulz, Pflanzenreich 4105: 82. 1927.

Cespitose perennial, caudex rather loosely branching. Leaves arising above the ground on sparingly leafy shoots or sobols, oblong, 3–5 mm. long, 1–2 mm. wide, midvein prominent, loosely stellate with short-stalked hairs, ciliate on the margins; scapes 2–6 cm. long, slender, pubescent; raceme becoming lax, 6–8-flowered; petals yellow, 7–8 mm. long; pods broadly lanceolate, 8–9 mm. long, compressed, pubescent with stellate hairs; style 2 mm. long, slender; seeds broadly winged all around, or only at apex.

Alpine summits, Boreal Zones; Siskiyou Mountains, southern Oregon, to Marble Mountain and Mount Shasta, California. Type locality: Preston's Peak, California. July–Aug.

12. *Draba incérta* Payson. Yellowstone Draba. Fig. 2076.

Draba incerta Payson, Amer. Journ. Bot. 4: 261. 1917.

Cespitose perennial, the short caudex branches clothed with the old leaf bases. Leaves linear-ob lanceolate, 7–10 mm. long, loosely stellate, ciliate with soft pilose hairs toward the base, in age glabrate and bright green on the upper surface; scapes 4–12 cm. high, sparsely pilose; inflorescence becoming a loose raceme in fruit; pedicels ascending, 3–15 mm. long; petals yellow, oblanceolate, 5 mm. long; pods broadly lanceolate, 4–8 mm. long, 2–3 mm. wide, cinereous with simple and stellate hairs; style less than 1 mm. long; seeds not winged.

Rocky ridges, Hudsonian Zone, Cascade Mountains of Washington to Alberta and Wyoming. Type locality: among rocks on the summit of Thunderer, Yellowstone Park, Wyoming. July–Aug.

13. *Draba Lemmònnii* S. Wats. Lemmon's Draba. Fig. 2077.

Draba Lemmonii S. Wats. Bot. Calif. 2: 430. 1880.

Cespitose perennial with a compact, very leafy, and much branched caudex, flowering scapes 2.5–8 cm. high, pilose or glabrous. Leaves 4–10 mm. long, spatulate to oblong-obovate, obtuse, thick, conspicuously ciliate, otherwise glabrous or sparingly pubescent with simple or 2–3-forked hairs; racemes short; sepals sparsely villous; petals yellow, 4 mm. long; fruiting pedicels slender, spreading, 2–8 mm. long; pods 6–8 mm. long, ovate to broadly lanceolate, more or less undulate or twisted, pubescent.

Clefts of rocks, on alpine summits, Hudsonian and Arctic-Alpine Zones; Sierra Nevada, California. Type locality: summit of Mount Lyall, at 13,000 feet altitude, California. July–Sept.

Draba Lemmonii var. *cyclomórpha* (Payson) O. E. Schulz, Pflanzenreich 4105: 94. 1927. Pods glabrous, otherwise closely resembling the typical species. Boreal Zones, Wallowa Mountains, Oregon.

Draba cruciàta Payson, Amer. Journ. Bot. 4: 265. 1917. Leaves slightly toothed, pubescent, with 4-forked hairs, otherwise not unlike *D. Lemmonii* S. Wats., of which it is probably merely a form. Based upon specimens collected in the vicinity of Mineral King, southern Sierra Nevada, California.

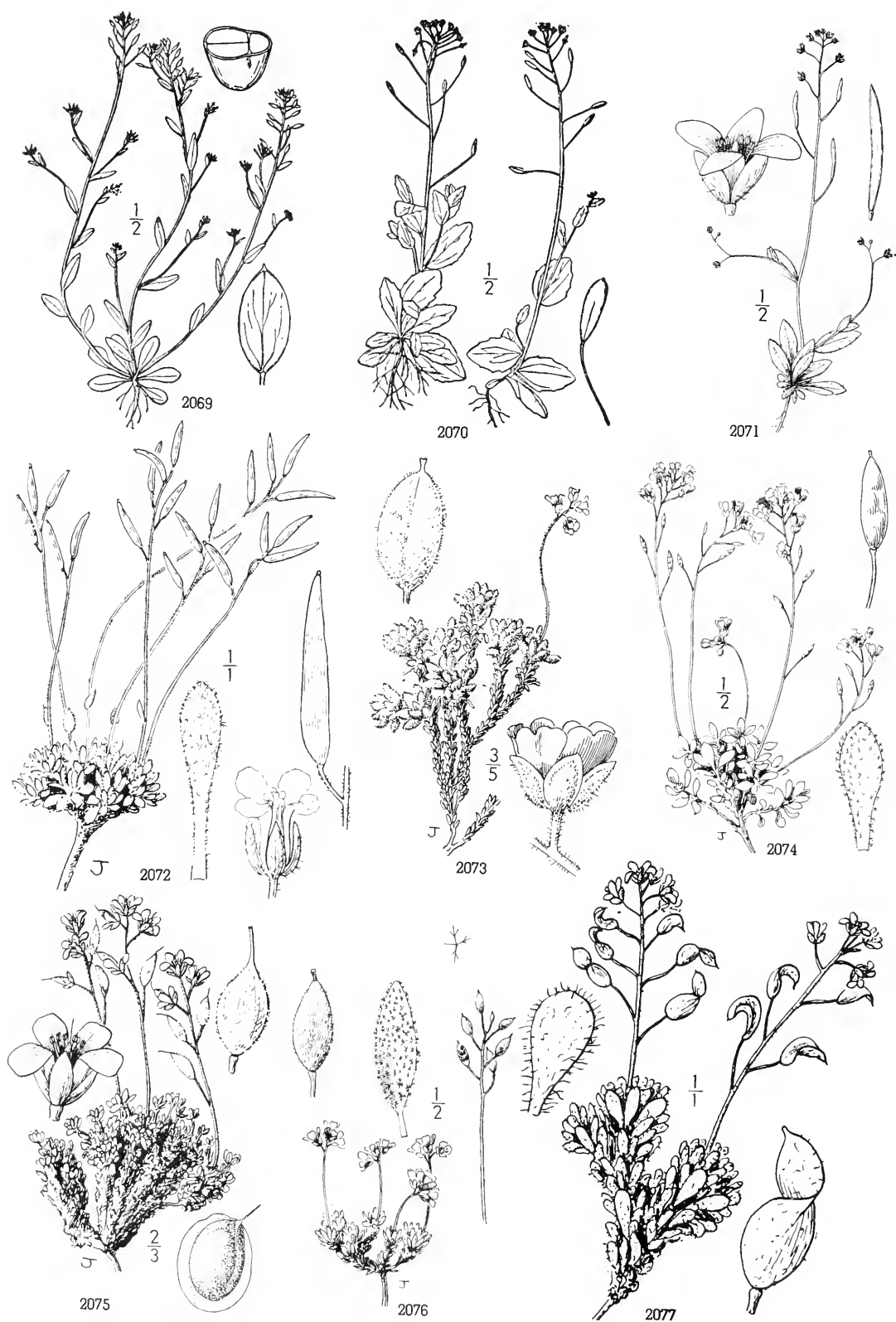
Draba longisquamèsa O. E. Schulz, Pflanzenreich 4105: 94. 1927. Differs from *D. Lemmonii* in the shape and size of the withered leaf bases on the branches of the caudex. An unsatisfactory and apparently inconstant character. Based upon specimens collected by Purpus (5118) somewhere in the southern Sierra Nevada, California.

14. *Draba Paysònnii* J. F. Macbride. Payson's Draba. Fig. 2078.

Draba vestita Payson, Amer. Journ. Bot. 4: 261. 1917. Not Davidson.

Draba Paysonii J. F. Macbride, Contr. Gray Herb. 56: 52. 1918.

Densely cespitose perennial, the branches densely clothed with the persistent old leaves.



2069. *Draba brachycarpa*
 2070. *Draba nemorosa*
 2071. *Draba stenoloba*

2072. *Draba lonchocarpa*
 2073. *Draba ruaxes*
 2074. *Draba Cusickii*

2075. *Draba Howellii*
 2076. *Draba incerta*
 2077. *Draba Lemmonii*

Leaves crowded, linear, about 5 mm. long, 1 mm. wide, midrib evident, cinereous with 2-4-forked pubescence, the forks stalked, cilia inconspicuous; flowering branches 2-5 cm. long, pubescent; racemes short, few-flowered, somewhat corymbose; sepals 2 mm. long, pubescent; petals 3 mm. long, white; pods broadly elliptic, 4 mm. long, 2.5 mm. wide, flattened, pubescent or glabrous; style 0.75 mm. long; seeds not winged.

Alpine ridges, Hudsonian and Arctic-Alpine Zones; Cascade Mountains, Washington, to the central Sierra Nevada, California, and Blue Mountains, Oregon, east to Montana and Utah. Type locality: Upper Marias Pass, Montana. June-Aug.

15. *Draba Nelsônii* Macbride & Payson. Nelson's *Draba*. Fig. 2079.

Draba Nelsonii Macbride & Payson, Amer. Journ. Bot. 4: 259. 1917.

Cespitose perennial, with short caudex branches. Leaves linear, 5-7 mm. long, about 1 mm. wide, obtuse at apex, midvein prominent, strongly ciliate on the margin, otherwise glabrous; scapes slender, glabrous or sparingly pubescent; petals yellow, 3-4 mm. long; raceme elongated in fruit; pods lanceolate, 3-6 mm. long, compressed, pubescent with simple hairs; style 1 mm. long; seeds wingless.

Rocky alpine slopes, Boreal Zones; eastern Washington and Idaho, south through eastern Oregon to the Sierra Nevada, California. Type locality: "Central chain of the Rockies towards Lewis's River." June-Aug.

Draba caeruleomontana Payson & St. John, Proc. Biol. Soc. Wash. 43: 119. 1930. Leaves linear or very narrowly oblanceolate, 10-15 mm. long, strongly ciliate on the margin and sparsely so on the prominent midvein, sparsely pubescent toward the apex with forked hairs; scapes 5-15 cm. long, glabrous or sparsely pubescent with simple and forked hairs; fruiting racemes usually elongated and open; pedicels 10-15 mm. long; pods oblong, strongly compressed, 4-7 mm. long, glabrous, or pubescent. Rock crevices, Boreal Zones; Blue Mountains of eastern Washington and Oregon. This species is very close to *D. Nelsonii* Macbride & Payson, and seems to intergrade with it in northern California.

16. *Draba sphaerula* Macbride & Payson. Desert *Draba*. Fig. 2080.

Draba sphaerula Macbride & Payson, Amer. Journ. Bot. 4: 258. 1917.

Draba globosa var. *sphaerula* O. E. Schulz, Pflanzenreich 4106: 103. 1927.

Densely cespitose perennial, branches of the caudex short and crowded. Leaves densely imbricated and incurved, forming rounded tufts, linear, about 2 mm. long, less than 1 mm. wide, glabrous except for cilia; scapes scarcely exceeding the leaves, pubescent; petals yellow; fruiting inflorescence corymbose; pods 1-3, about 3 mm. long, flat, stellate; style scarcely 1 mm. long.

Desert mountain ranges, Boreal Zones; Idaho to western Nevada and the White Mountains, California. Type locality: "Parker Mountain, Custer Co., Idaho." June-July.

17. *Draba subsessilis* S. Wats. White Mountain *Draba*. Fig. 2081.

Draba subsessilis S. Wats. Proc. Amer. Acad. 23: 255. 1888.

Draba oligosperma var. *sessilis* O. E. Schulz, Pflanzenreich 4106: 100. 1927.

Cespitose perennial, the branches of the caudex short. Leaves narrowly oblong, obtuse, 2-3 mm. long, densely imbricated, finely silvery stellate; scapes very short, stellate; petals white, 2 mm. long; fruiting pedicels 2 mm. long; pods ovoid, 4 mm. long; style thick, scarcely 0.5 mm. long.

Alpine summits, Boreal Zones; White Mountains and central Sierra Nevada (Mount Dana), California. Type locality: altitude 13,000 feet, White Mountains, Mono County, California. June-July.

18. *Draba novolympica* Payson & St. John. Olympic *Draba*. Fig. 2082.

Draba novolympica Payson & St. John, Proc. Biol. Soc. Wash. 43: 113. 1930.

Perennial, densely cespitose with many short dichotomous branches densely clothed with the old leaf bases. Leaves linear or narrowly linear-ob lanceolate, 3-4 mm. long, incurved, coriaceous, keeled on the back by the prominent midvein, loosely pubescent with forked hairs; scapes slender, villous-pubescent, 1 cm. long or less, 3-8-flowered; petals yellow, 3-3.5 mm. long; pods ovate-lanceolate, oblique, 2-5 mm. long, pubescent with forked hairs; styles stout, 0.2-0.3 mm. long; seeds 2-6, brown, wingless.

Rocky mountain ridges, Arctic-Alpine Zone; Olympic and Cascade Mountains, Washington. Type locality: rocky summits, altitude 6,000 feet, Olympic Mountains, Washington. July-Aug.

19. *Draba Douglasii* A. Gray. Douglas' *Draba*. Fig. 2083.

Draba Douglasii A. Gray, Proc. Amer. Acad. 7: 328. 1867.

Draba oregonensis A. Gray, Proc. Amer. Acad. 17: 199. 1882.

Draba Crockeri Lemmon, Bull. Torrey Club 16: 221. 1889.

Cespitose perennial, the branches of the caudex very short. Leaves spatulate-linear, 3-6 mm. long, scarcely 2 mm. wide, firm, midvein prominent, weakly ciliate on the margins, sparsely pubescent with simple or obscurely 2-forked hairs, usually soon glabrate; scapes scarcely exceeding the leaves, pubescent; raceme 10-15 mm. long; petals white, 3 mm. long; pods ovoid, 4 mm. long, acuminate, the sides convex; style slender, 1.5-2 mm. long.

Boreal Zones; Klickitat County, Washington, south through eastern Oregon and the Sierra Nevada to the San Bernardino Mountains, California. Originally collected by Douglas, but definite locality not known. May-June.

Draba cascadenis Payson & St. John, Proc. Biol. Soc. Wash. 43: 111. 1930. Leafy-stemmed perennial, loosely pubescent with forked hairs; fruiting racemes 5-7 cm. long; pods 8-12 mm. long, puberulent with simple and forked hairs. Moist alpine meadows, Glacier Peak, Snohomish County, Washington.

20. *Draba Brewerii* S. Wats. Brewer's Whitlow-grass. Fig. 2084.

Draba Brewerii S. Wats. Proc. Amer. Acad. 23: 260. 1888.

Low cespitose perennial, with a much branched densely leafy cushion-like caudex, hoary

throughout with a dense stellate pubescence; flowering stems 2.5–10 cm. high. Basal leaves 4–8 mm. long, oblong, obtuse, entire or sparingly toothed; sepals oblong; petals white, 2–3 mm. long; pedicels ascending, 3–4 mm. long; pods 4–6 mm. long, linear-oblong, obtusish, often twisted, stellate-pubescent; style scarcely evident.

Rocky alpine slopes, Hudsonian and Arctic-Alpine Zones; Siskiyou County south in the Sierra Nevada to Tulare County, California. Type locality: Mount Dana, 12,000 feet altitude. June–Sept.

Draba Breweri var. *sublaxa* Jepson, Man. Fl. Pl. Calif. 444. 1925. Flowering stems 10–15 cm. high; pubescence thinner; lower leaves less crowded, thinner, oblanceolate, 12–18 mm. long; pods 6–8 mm. long, oblong-lanceolate, acute or acuminate. Known only from a single collection on the saddle between Mount Dana and Mount Gibbs, Sierra Nevada, California.

21. *Draba aurèola* S. Wats. Mount Lassen *Draba*. Fig. 2085.

Draba aureola S. Wats. Bot. Calif. 2: 430. 1880.

Low caespitose perennial, stellate-pubescent throughout, with a simple or branched caudex, flowering stems simple or branching above, 5–10 cm. high, leafy to the inflorescence and densely so below. Basal leaves oblanceolate, 12–16 mm. long, obtuse, entire; stem leaves shorter, oblong; racemes crowded even in fruit; sepals glabrous; petals yellow, 3–4 mm. long; fruiting pedicels spreading, 4–6 mm. long; pods broadly oblong, obtuse, 8–10 mm. long, stellate, not twisted; style stout, 1 mm. long.

High volcanic peaks, Arctic-Alpine Zone; known from Mount Rainier, Washington, Three Sisters, Oregon, and Mount Lassen, California. Type locality: Lassen's Peak, California. June–Aug.

22. *Draba corrugata* S. Wats. Southern California *Draba*. Fig. 2086.

Draba corrugata S. Wats. Bot. Calif. 2: 430. 1880.

Draba saxosa Davidson, Bull. S. Calif. Acad. 19: 11. 1920.

Loosely stellate-pubescent perennial with a simple or branched leafy caudex; flowering stems several, 5–15 cm. high. Basal leaves in a dense tuft, 8–25 mm. long, rarely longer, narrowly obovate to oblanceolate, obtuse, entire; stem leaves few and much smaller; sepals pubescent; petals pale yellow, narrowly linear-spatulate, 2–3 mm. long, retuse; fruiting pedicels ascending, 2–10 mm. long; pods 4–10 mm. long, broadly oblong to lanceolate, acute or obtuse, stellate, corrugated and twisted; style 2 mm. long.

Dry gravelly or rocky places, Canadian Zones; southern California from the San Gabriel to the San Jacinto Mountains. Type locality: Mount San Geronio (Greyback), San Bernardino Mountains. June–Sept.

41. *ATHÝSANUS* Greene. Bull. Calif. Acad. 1: 72. 1885.

Slender diffuse annual, leafy only near its base, hirsute with spreading forked hairs. Leaves simple, few-toothed. Flowers minute, in very loose elongated unilateral racemes. Pedicels slender, recurved. Sepals equal. Petals linear or often wanting. Stamens 6, equal or nearly so. Ovary 1-celled, 2-ovuled. Silicles orbicular, not winged or margined, 1-seeded, indehiscent. [Name Greek, meaning without fringe, in reference to the wingless pod.]

A monotypic Pacific Coast genus.

1. *Athysanus pusillus* (Hook.) Greene. Dwarf *Athysanus*. Fig. 2087.

Thysanocarpus pusillus Hook. Ic. Pl. 1: pl. 42. 1837.

Thysanocarpus oblongifolius Nutt. in Torr. & Gray, Fl. N. Amer. 1: 118. 1838.

Athysanus pusillus Greene, Bull. Calif. Acad. 1: 72. 1885.

Athysanus pusillus var. *glabrior* S. Wats. in Gray, Syn. Fl. N. Amer. 1st: 113. 1895.

Stems very slender, branching from the base, the branches ascending, 10–30 cm. long, unilaterally racemose from near the base. Leaves few, 5–20 mm. long, ovate-oblong, sparingly toothed; flowers minute, about 1.5 mm. long, often without petals; pod 1-seeded, orbicular, flattened, 1.5–2 mm. long, uncinately-hispid, indehiscent; fruiting pedicels 2–6 mm. long.

Usually gravelly or sandy soils, Arid Transition and Upper Sonoran Zones; British Columbia and Idaho, south to southern California. Type locality: "Monterey, California." April–July.

42. *HETERODRÀBA* Greene, Bull. Calif. Acad. 1: 71. 1885.

Low diffuse annual, stellate-hispidulous, branching from the base, the branches very slender, flower-bearing from near the leafy base. Leaves cuneate-obovate to oblanceolate, few-toothed or entire. Flower white in very lax unilateral racemes, minute. Pedicels recurved and distant in fruit. Silicles pubescent, round-oval, compressed, 2-celled, ultimately dehiscent. Seeds 6–12, hispidulous; cotyledons accumbent. [Name Greek, meaning different, and *Draba*, the genus to which this species was formerly referred.]

A monotypic California genus.

1. *Heterodraba unilateràlis* (M. E. Jones) Greene. *Heterodraba*. Fig. 2088.

Draba unilateralis M. E. Jones, Bull. Torrey Club 9: 124. 1882.

Heterodraba unilateralis Greene, Bull. Calif. Acad. 1: 72. 1885.

Athysanus unilateralis Jepson, Fl. W. Mid. Calif. 224. 1901.

Branching from the base, the branches very slender, 10–40 cm. long, diffuse, ascending or trailing, rigid or wiry in age, racemose to near the base. Leaves 10–25 mm. long, cuneate-obovate to oblanceolate, sparingly toothed or entire; flowers 2 mm. long; pods round-oval, 2–5 mm. long, twisted, hispidulous but not uncinately; fruiting pedicels thick, 1–2 mm. long.

Hillsides and plains, Upper Sonoran Zone; Oregon to Lower California. Type locality: "About 15 miles south of the California line in Mexico about 60 miles from San Diego." March–April.

43. *THYSANOCÁRPUS* Hook. Fl. Bor. Amer. 1: 69. pl. 18. f. A. 1833.

Erect slender sparingly branched annuals, with minute white or rose-colored flowers in slender elongated racemes. Sepals spreading, ovate. Petals spatulate. Stamens 6 or rarely only 4. Ovary 1-celled, 1-ovuled. Silicle indehiscent, orbicular, strongly compressed, winged, the wings entire, crenate or perforated, or with radiating nerves. [Name from two Greek words, meaning fringe and fruit, in reference to the winged pod.]

A genus of 3 or 4 species, natives of western North America. Type species, *Thysanocarpus curvipes* Hook.

Fruiting pedicels recurved their whole length; wings of the pods with broad radiating nerves or sometimes nerveless.

Basal leaves rosulate, usually hirsute; cauline lanceolate, auriculate.

1. *T. curvipes*.

Basal leaves not rosulate, usually glabrous, entire or sparingly laciniately toothed.

Wings of the pod entire or crenate.

2. *T. laciniatus*.

Wings of the pod divided into spatulate lobes, often revolute.

3. *T. conchuliferus*.

Fruiting pedicels straight up to the abruptly recurved apex; wings of the pods with narrow almost filiform radiating nerves.

4. *T. radians*.

1. *Thysanocarpus cúrvipes* Hook. Hairy Fringe Pod. Fig. 2089.

Thysanocarpus curvipes Hook. Fl. Bor. Amer. 1: 69. pl. 18. f. A. 1833.

Thysanocarpus pulchellus Fisch. & Mey. Ind. Sem. Hort Petrop. 2: 50. 1835.

Thysanocarpus curvipes var. *involutus* Greene, Fl. Fran. 275. 1891.

Plant more or less hirsute, the stems branching above, 2–5 dm. high. Basal leaves rosulate, oblong in outline, pinnatifid with short blunt lobes or dentate; stem leaves lanceolate, sagittate, auriculate-clasping, 1–2 cm. long; pedicels very slender, strongly recurved, 3–6 mm. long; pod 2–5 mm. in diameter, usually tomentose, wings entire or crenate, rarely perforated, often very convex on one side; style very short, about 0.5 mm. long.

Grassy hillsides, Upper Sonoran and Transition Zones; British Columbia and Idaho south to Lower California. Type locality: "On moist ground near the Great Falls of the Columbia."

This is a variable species and several segregates have been proposed. The following are the most pronounced:

Thysanocarpus curvipes var. *longistylus* Jepson, Man. Fl. Pl. Calif. 447. 1925. Style slender, 1.25–2 mm. long, often slightly curved; pods as in the typical form. Arid Transition Zone, Sierra Nevada, California.

Thysanocarpus curvipes var. *élegans* (Fisch. & Mey.) Robinson in A. Gray, Syn. Fl. N. Amer. 11: 114. 1895. Extremes readily distinguished from the typical species in the larger (5–7 mm. broad) perforated pods; style exerted beyond the broad wing, 1–1.25 mm. long, but these characters are variable as is also the pubescence of the pod. Grassy slopes, Upper Sonoran Zone; central California.

2. *Thysanocarpus laciniátus* Nutt. Narrow-leaved Fringe Pod. Fig. 2090.

Thysanocarpus laciniatus Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 118. 1838.

Plants smooth or nearly so and glaucous, the stems 2–4 dm. high, branching above. Leaves not rosulate at base, the lower linear, subentire or pinnatifid into narrow linear acute segments; upper leaves narrowly linear, 2–3 cm. long and only 2–3 mm. wide, narrowed at base, and not auriculate or obscurely so; pod elliptical to orbicular, 3–4 mm. in diameter, wing entire or crenate, not perforated, reticulate, the body usually glabrous; pedicels slender, deflexed.

Grassy plains and hillsides, Upper Sonoran Zone; Inner Coast Ranges of central California to Lower California and Arizona. Type locality: Santa Barbara, California. March–April.

Thysanocarpus laciniatus var. *crenátus* (Nutt.) Brewer in Brewer & Wats. Bot. Calif. 1: 49. 1880. General habit of the typical species, but the stem usually a little stouter and more strictly erect; pods usually glabrous with the broad wings crenate and more or less perforated between the conspicuous radiating nerves. Monterey County south to Santa Barbara, California.

Thysanocarpus laciniatus var. *emarginátus* (Greene) Jepson, Man. Fl. Pl. Calif. 447. 1925. Lower part of stem hirsute; pods orbicular; glabrous wings entire or crenate, scarious, the radiating nerves wanting or very short. California Coast Ranges from Contra Costa County to San Diego County.

Thysanocarpus laciniatus subsp. *desertorum* (Heller) Abrams. (*T. desertorum* Heller, Muhlenbergia 2: 47. 1905.) Herbage glabrous and very glaucous; leaves rather thick and usually bluntly acutish; pods glabrous or often minutely scabrous, orbicular; wing scarious, entire, crenate or lobed, radiating nerves absent or very short. Desert slopes from Inyo County, California, to Lower California.

3. *Thysanocarpus conchulíferus* Greene. Island Fringe Pod. Fig. 2091.

Thysanocarpus conchuliferus Greene, Bull. Torrey Club 13: 218. 1886.

Thysanocarpus laciniatus var. *conchuliferus* Jepson, Man. Fl. Pl. Calif. 447. 1925.

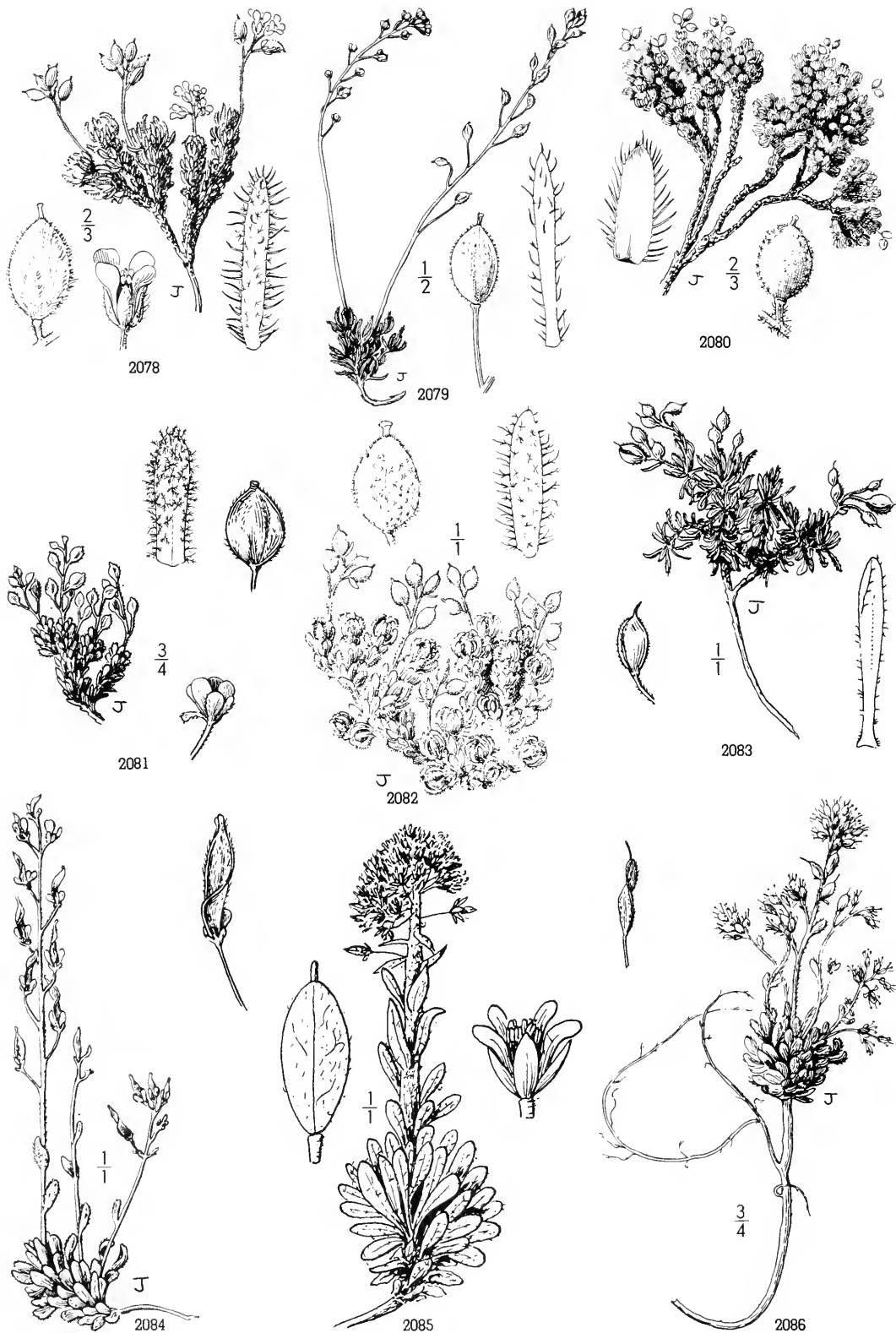
Plants simple or divergently branching, glabrous, 1–2 dm. high. Leaves linear, not rosulate at base, the lower cleft into a few spreading lobes narrowed to the base, the upper auriculate-clasping, toothed or entire; racemes short; flowers white or tinged with rose; pods cymbiform, the margin divided into spatulate lobes, strongly revolute; pedicels slender, diverging or somewhat recurved.

Crevices of rocks or on mossy banks, Upper Sonoran Zone; Santa Cruz Island, southern California. March–April.

4. *Thysanocarpus ràdians* Benth. Ribbed Fringe Pod. Fig. 2092.

Thysanocarpus radians Benth. Pl. Hartw. 297. 1848.

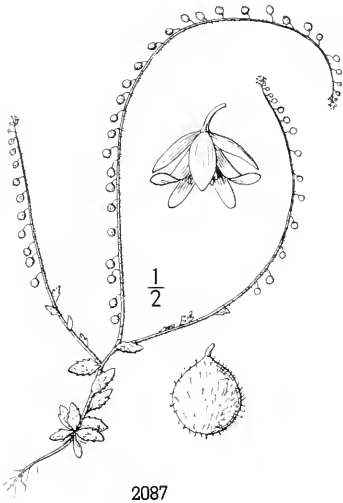
Plants glabrous, the stems 2–4 dm. high, with a few elongated ascending branches. Lowest leaves runcinately toothed or pinnatifid, the upper ovate-oblong or ovate-lanceolate, subentire,



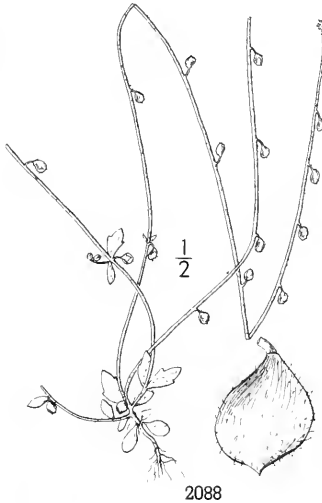
2078. *Draba Paysonii*
2079. *Draba Nelsonii*
2080. *Draba sphaerula*

2081. *Draba subsessilis*
2082. *Draba novolympica*
2083. *Draba Douglasii*

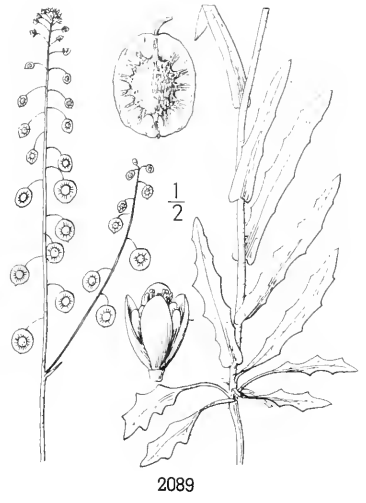
2084. *Draba Breweri*
2085. *Draba aureola*
2086. *Draba corrugata*



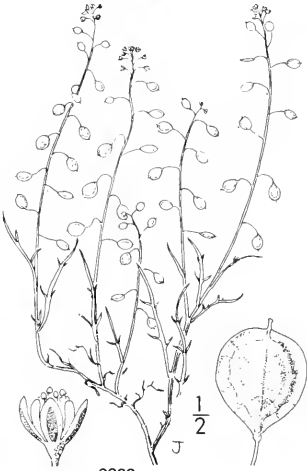
2087



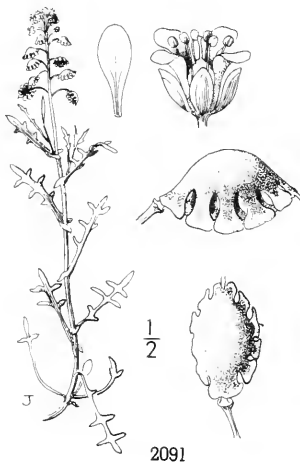
2088



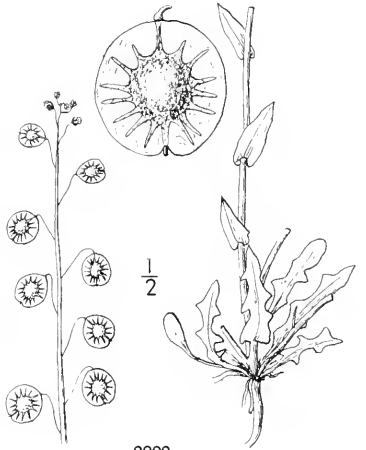
2089



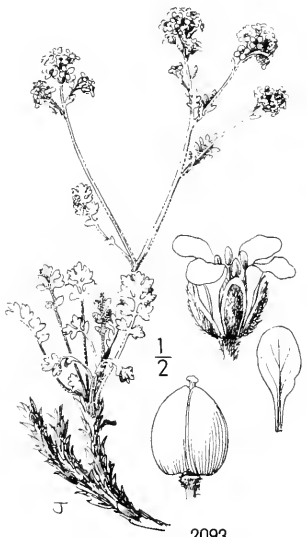
2090



2091



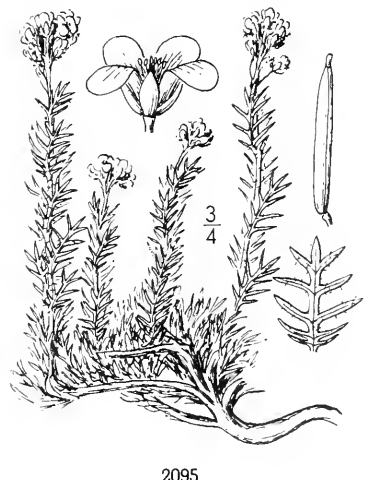
2092



2093



2094



2095

2087. *Athysanus pusillus*2088. *Heterodraba unilateralis*2089. *Thysanocarpus curvipes*2090. *Thysanocarpus laciniatus*2091. *Thysanocarpus conchuliferus*2092. *Thysanocarpus radians*2093. *Smelowskia ovalis*2094. *Smelowskia calycina*2095. *Smelowskia Fremontii*

cordate-auriculate; racemes elongated, loosely flowered; pedicels ascending, recurved only at the apex, 8–15 mm. long; pods orbicular, 8–10 mm. broad, plano-convex, the wing entire, white-membranous, conspicuously marked with dark slender radiating nerves.

Grassy plains or hillsides usually in gravelly soil, Upper Sonoran Zone; southern Oregon to the North Coast Ranges and the Sacramento Valley, California. Type locality: Sacramento Valley, California.

44. *SMEŁŌWSKIA* C. A. Mey. in Ledeb. Fl. Alt. 3: 165. 1831.

Low caespitose perennial, with a suffruticose caudex. Leaves pinnatifid, canescent with stellate hairs. Flowers racemose, small, white, yellowish or tinged with purple. Sepals somewhat spreading, sub-equal. Petals obovate, exserted. Pod lanceolate-oblong or ovate, more or less obcompressed; valves strongly keeled; stigma sessile; seeds few to numerous; cotyledons incumbent. [Name in honor of Timotheus Smielowski, Russian botanist, 19th century.]

A genus of 7 species, natives of northern Asia and western North America.

Leaf-segments oblong-lanceolate to obovate, usually densely white-tomentose; pods, if compressed, flattened parallel with the partition.

Pods ovoid, 4–5 mm. long.

Pods linear-lanceolate, acute at both ends.

Leaf-segments narrowly linear, very sparsely pubescent with forked hairs; pods linear, obtuse at both ends, usually 4-sided, if compressed, flattened contrary to the partition.

1. *S. ovalis*.

2. *S. calycina*.

3. *S. Fremontii*.

1. *Smelowskia ovalis* M. E. Jones. Alpine Smelowskia. Fig. 2093.

Smelowskia ovalis M. E. Jones, Proc. Calif. Acad. II, 5: 624. 1895.

Plants caespitose with a branched caudex, the herbage densely white-villous and finely stellate-pubescent, the stems 3–10 cm. high. Basal leaves pinnatifid, the segments entire or 2–3-cleft; pods ovoid, rounded or subcordate at base, 4–5 mm. long.

Rocky places at high altitude, Hudsonian and Arctic-Alpine Zones; Cascade Mountains, Okanogan County, Washington, to Three Sisters, Oregon. Type locality: above timber line, Mount Adams, Washington. July–Aug.

2. *Smelowskia calycina* (Desv.) C. A. Mey. Siberian Smelowskia. Fig. 2094.

Hutchinsia calycina Desv. Journ. Bot. 3: 168. 1814.

Smelowskia calycina C. A. Mey. in Ledeb. Fl. Alt. 3: 170. 1831.

Smelowskia lineariloba Rydb. Bull. Torrey Club 31: 555. 1904.

Plants densely caespitose from a stout branched caudex covered with remains of the old leaves, densely canescent with stellate pubescence and a few longer simple hairs, the stems 5–5 cm. high. Leaves deeply pinnatifid, the segments linear to oblong, obtuse; petals 4 mm. long; pods lanceolate, attenuate at each end, 6–10 mm. long.

Rocky places, Boreal Zones; Alaska, British Columbia, and Alberta to Colorado and Oregon; also Siberia. In the Pacific States it has been collected in the Olympic Mountains, Mount Stuart, and the Wallowa Mountains, Washington, and in the Wallowa Mountains, Oregon.

3. *Smelowskia Fremontii* S. Wats. Fremont's Smelowskia. Fig. 2095.

Smelowskia Fremontii S. Wats. Proc. Amer. Acad. 11: 123. 1876.

Braya pectinata Greene, Erythea 3: 69. 1895.

Polycytenium Fremontii Greene, Leaflets Bot. Obs. 2: 219. 1912.

Plants caespitose with a very short mostly simple caudex, the stems tufted, erect, 5–10 cm. high, the herbage thinly pubescent and greenish. Leaves pinnate with narrowly linear bristle-tipped pungent segments; pedicels and sepals glabrous; pod linear, 8–10 mm. long, 4-sided or slightly compressed contrary to the partition.

Grassy places, Boreal and Arid Transition Zones; eastern Oregon to northeastern California. Type locality: "On hills near Klamath Lake," Oregon. May–June.

Smelowskia Fremontii var. *bisulcata* (Greene) O. E. Schulz, Pflanzenreich 4106: 359. 1924. (*Polycytenium bisulcatum* Greene, op. cit. 2: 220.) Rather densely stellate-pubescent; sepals pubescent; pods distinctly compressed contrary to the partition, somewhat bisulcate. Silvies Valley, Blue Mountains, Oregon.

45. *TÚRRITIS* L. Sp. Pl. 666. 1753.

Herbaceous plants with tall stems and partly clasping auriculate leaves. Flowers in elongated racemes. Sepals erect. Petals yellowish white, small. Stamens 6; anthers not sagittate at the base. Stigmas sessile, cupulate. Pod erect, linear-cylindric, terete, the valves 1-nerved. Seeds flattened; cotyledons obliquely incumbent. [Name Latin, meaning turreted.]

A genus of 5 species of wide geographical distribution. Type species, *Turritis glabra* L.

1. *Turritis glabra* L. Tower Mustard. Fig. 2096.

Turritis glabra L. Sp. Pl. 666. 1753.

Arabis glabra Bernh. Syst. Verz. Erf. 195. 1800.

Arabis perfoliata Lam. Encycl. 1: 219. 1783.

Biennial, the stems mostly simple, erect, glabrous and glaucous above, pubescent below, 5–10

cm. high. Basal leaves petioled, 5–10 cm. long, oblanceolate to oblong, dentate or sometimes lyrate, pubescent with simple hairs; stem leaves sessile, sagittate, lanceolate or oblong, all but the lowest glabrous; petals yellowish white, 3 mm. long; pedicels erect, 4–12 mm. long; pods erect, 4–10 cm. long, 1.5–2 mm. wide.

Fields and grassy slopes, Boreal and Austral Zones; British Columbia to Quebec, southern California, and Pennsylvania; also in Europe and Asia. March–Aug.

46. *ARABIS* L. Sp. Pl. 664. 1753.

Annual or perennial herbs, glabrous or pubescent with forked hairs, with simple mostly toothed leaves and white or purplish flowers. Stamens 6; filaments unappendaged. Pods sessile, elongated, flattened parallel with the partition, the valves usually 1-nerved, dehiscent but not elastic; stigma entire or 2-lobed. Seeds in 1 or 2 rows in each cell, winged or wingless; cotyledons accumbent. [Name from Arabia.]

A genus of about 120 species, mainly natives of the northern hemisphere. Type species, *Arabis alpina* L.

Delicate annuals; leaves at least the lower pinnate or pinnatifid.

Seeds oblong-ellipsoid, wingless.

I. FILIFOLIAE.

Seeds orbicular, narrowly winged.

II. VIRGINICAE.

Perennials or a few biennials.

Basal leaves lyrate-lobed; seeds oblong, wingless.

III. LYRATAE.

Basal leaves entire or toothed.

Pods erect or nearly so.

Leaves coarsely hirsute with simple or mostly simple hairs, sometimes glabrous.

Stem leaves neither cordate nor auriculate.

IV. FURCATAE.

Stem leaves cordate or auriculate.

V. HIRSUTAE.

Leaves pubescent with more or less forked or stellate hairs, sometimes glabrous.

Styles obsolete or short, not filiform.

Pods 1–2.5 mm. wide.

Stem leaves not auriculate.

Pods 1 mm. wide; flowers white.

VI. WHITEDIANAE.

Pods 2–2.5 mm. wide; flowers purple.

VII. BLEPHAROPHYLLAE.

Stem leaves auriculate.

VIII. DRUMMONDIANAE.

Pods 4–5 mm. wide.

IX. PLATYSPERMAE.

Styles filiform, 4–6 mm. long.

X. PARISHIANAE.

Pods spreading or reflexed.

Stem leaves not auriculate.

Leaves all wing-petioled, usually repand; pods glabrous.

XI. REPANDENTES.

Leaves sessile, entire; pods usually stellate.

XII. PULCHRAE.

Stem leaves auriculate-clasping.

Pods stellate-pubescent.

XIII. SUBPINNATIFIDAE.

Pods glabrous.

Pods 3–4 mm. wide.

XIV. SUFFRUTESCENTES.

Pods 1–2.5 mm. wide.

Pods spreading or somewhat recurved on spreading pedicels.

Perennials with a caudex.

Plants suffruticose at the base, 3 dm. or more high.

XV. PERENNANTES.

Plants caespitose, 1–2 dm. high.

XVI. RECONDITAE.

Biennials or short-lived perennials, stout, 3 dm. or more high.

XVII. ARCUATAE.

Pods and pedicels strongly reflexed.

XVIII. RETROFRACTAE.

I. FILIFOLIAE.

Leaves all pinnately divided into filiform segments; glabrous plants.

1. *A. filifolia*.

Leaves at base pinnately divided into linear or lanceolate lobes, those subtending the branches mainly entire; plant inconspicuously and often sparsely puberulent with forked hairs.

2. *A. deserti*.

II. VIRGINICAE.

Annual, spreading, pubescent; leaves pinnately divided or pinnatifid.

3. *A. virginica*.

III. LYRATAE.

Perennials; basal leaves lyrate-pinnatifid, those of the stem simple.

4. *A. lyrata kamchatica*.

IV. FURCATAE.

Perennials, more or less caespitose; seeds oblong, wingless or winged only at the base.

Seeds wingless; basal leaves hirsute.

Petals 4–6 mm. long.

5. *A. Nuttallii*.

Petals 3–4 mm. long.

6. *A. macella*.

Seeds winged on the lower margin.

Basal leaves merely ciliate on the margin; flowers white.

Petals 2 mm. long, equaling the sepals.

7. *A. olympica*.

Petals 6–12 mm. long.

8. *A. furcata*.

Basal leaves hirsute; flowers deep rose-purple.

9. *A. aculeolata*.

Biennials from a taproot and usually with a simple crown; seeds orbicular, winged all around.

10. *A. Cusickii*.

V. HIRSUTAE.

Stems simple or nearly so; petals 4–5 mm. long, white.

11. *A. hirsuta*.

VI. WHITEDIANAE.

Coarsely stellate-pubescent; flowers small, white.

12. *A. Whitedii*.

VII. BLEPHAROPHYLLAE.

Plants with a branched woody caudex; coastal.

13. *A. blepharophylla*.

Plants from a slender rootstock; montane.

14. *A. purpurascens*.

VIII. DRUMMONDIANAE.

Pubescence when present of 2-forked hairs.

Seeds in 1 row; midrib obscure or absent; basal leaves ciliate on base and petiole; plant otherwise glabrous.

15. *A. Lyallii*.

Seeds in 2 rows; midrib of pod conspicuous; basal leaves with appressed 2-forked hairs, or almost glabrous.

16. *A. Drummondii*.

Pubescence of 3–4-forked hairs.

Stems solitary or few from a short crown, strictly erect; pods usually 1.5–2 mm. wide.

Pods obtuse or acutish, not beaked.

17. *A. Bolanderi*.

Pods ascending, sharply acute and tipped by a slender beak.

18. *A. acutina*.

Stems very slender and decumbent at base, from a much branched caespitose caudex; pods 1 mm. wide, ascending.

19. *A. microphylla*.

IX. PLATYSPERMAE.

Leaves and lower part of stem stellate.

20. *A. platysperma*.

Leaves and stems glabrous except for cilia on the petiole.

Seeds in 2 rows; pods usually 4–5 mm. wide; stem leaves often auriculate.

21. *A. Howellii*.

Seeds in 1 row; pods 3–4 mm. wide; leaves not auriculate.

22. *A. Covillei*.

X. PARISHIANAE.

Cespitose, perennial; stellate-pubescent; leaves linear, sessile.

23. *A. Parishii*.

XI. REPARENTES.

Biennial, stellate-pubescent; pods 6–8 cm. long, 3–3.5 mm. wide.

24. *A. repanda*.

XII. PULCHRAE.

Stem leaves sessile; seeds in 2 rows.

25. *A. pulchra*.

XIII. SUBPINNATIFIDAE.

Stem leaves more or less toothed; pods beaked by a short style.

26. *A. subpinnatifida*.

Stem leaves entire; pods acutish; stigma sessile.

27. *A. Beckwithii*.

XIV. SUFFRUTESCENTES.

Pods attenuate to a short thick style.

28. *A. suffrutescens*.

Pods rounded at each end.

29. *A. glaucovalvula*.

XV. PERENNANTES.

Stems roughish stellate-pubescent; petals 4–5 mm. long.

30. *A. perennans*.

Stems glabrous; petals 8 mm. long.

31. *A. atrorubens*.

XVI. RECONDITAE.

Petals 3–4 mm. long.

32. *A. Lemmonii*.

Petals 8–10 mm. long.

Upper part of stem and pedicels villous-pubescent.

33. *A. Breweri*.

Upper part of stem and pedicels glabrous.

34. *A. Koehleri*.

XVII. ARCUATAE.

Pedicels sparsely villous with long mostly simple hairs; petals dark purple, 12–15 mm. long; biennial.

35. *A. sparsiflora*.

Pedicels more or less stellate, glabrous in no. 38.

Short-lived perennial or biennial; stems solitary or few from an unbranched crown; petals pale purple, 6 mm. long.

36. *A. campylobola*.

Perennial with a branched woody caudex; petals deep reddish purple, 10–12 mm. long.

Stems and pedicels stellate-pubescent, the latter arcuate-spreading or recurved.

37. *A. maxima*.

Stems, at least the upper part, and pedicels glabrous, the latter ascending.

38. *A. Hoffmannii*.

XVIII. RETROFRACTAE.

Basal leaves ciliolate on the margins.

39. *A. rectissima*.

Basal leaves not ciliolate on the margins.

Plants not caespitose, sparsely to rather densely stellate; basal leaves oblanceolate.

Capsule 2 mm. wide; seeds in 2 rows in each cell.

40. *A. Holboellii*.

Capsule 1 mm. wide; seeds in 1 row in each cell.

41. *A. secunda*.

Plants caespitose, hoary with a dense stellate-pubescent; basal leaves linear.

42. *A. puberula*.

1. *Arabis filifolia* Greene. Island Rock-cress, Thread-leaf Rock-cress. Fig. 2097.

Cardamine filifolia Greene, Pittonia 1: 30. 1887.

Arabis filifolia Greene, Bull. Calif. Acad. 2: 390. 1887.

Sibara filifolia Greene, Pittonia 3: 11. 1896.

Annual, glabrous and somewhat glaucous, the stems erect, slender, branching above, 2–3 dm.

high. Leaves all pinnately divided, the segments filiform, 20–25 mm. long; flowers racemose, rose-purple; petals 5–6 mm. long, the blade broadly obovate, narrowed to a claw; fruiting pedicels short; pods ascending, very narrowly linear, 3–4 cm. long, acute; seeds in 1 row, wingless.

Canyons, Upper Sonoran Zone; Santa Cruz and Santa Catalina Islands, southern California. Type locality: Santa Cruz Island. April.

2. *Arabis déserti* (M. E. Jones) Abrams. Desert Rock-cress. Fig. 2098.

Thelypodium déserti M. E. Jones, Contr. West. Bot. No. 12: 1. 1908.

Slender annual, 15–30 cm. high, branching from or usually above the base, the branches slender, ascending, glabrous or sparsely puberulent with forked hairs. Basal leaves 3–5 cm. long, deeply pinnatifid into several rather distant linear to oblanceolate lobes, some of the lobes often again lobed near the base on the upper margin; stem leaves subtending the branches narrowly linear, entire or few-toothed or rarely lobed; racemes loose and rather weak, elongated, usually well exceeding the stem proper; sepals oblong-ovate, 1.5 mm. long, sparsely puberulent with forked hairs to subglabrous, scarious-margined; petals white, 2.5 mm. long, the blade scarcely 1 mm. wide but little broader than the claw, rounded or obtuse at apex; anthers 0.5 mm. long; pods 10–20 mm. long, 1 mm. wide, compressed, ascending, straight or slightly arcuate, beak 1–2 mm. long; pedicels spreading or ascending, 1–3 mm. long; seed oblong, not winged.

Rock crevices and gravelly washes, Lower Sonoran Zone; Emigrant Canyon, Panamint Mountains, and Death Valley, California, and Amargosa Desert, Nevada. Type locality: Amargosa Desert. March–May.

3. *Arabis virginica* (L.) Trelease. Virginia Rock-cress. Fig. 2099.

Cardamine virginica L. Sp. Pl. 656. 1753.

Cardamine Ludoviciana Hook. Journ. Bot. 1: 191. 1834.

Arabis Ludoviciana C. A. Mey. Ind. Sem. Petrop. 9: 60. 1842.

Arabis virginica Trelease ex Branner & Coville, Rep. Geol. Surv. Ark. 1884: 165. 1891.

Planodes virginica Greene, Leaflets Bot. Obs. 2: 221. 1912.

Annual or rarely biennial, glabrate, the stems ascending or decumbent, 15–30 cm. long. Leaves oblong, deeply pinnatifid, 25–70 mm. long, the lower petioled, the upper nearly sessile; pedicels spreading or ascending, 4 mm. long in fruit; flowers very small, white; pods linear, ascending, 15–25 mm. long, about 2 mm. wide; seeds orbicular, wing-margined, nearly as broad as the pod.

In desiccated vernal pools, Sonoran Zones; southern California and Lower California to Virginia, Florida, and Texas. Type locality: Virginia. March–May.

4. *Arabis lyrata* subsp. *kamchatica* Fisch. Kamchatka or Western Rock-cress. Fig. 2100.

Arabis ambigua var. *intermedia* DC. Syst. 2: 231. 1821.

Arabis lyrata var. β DC. loc. cit.

Arabis kamchatica Fisch. ex DC. loc. cit. as a synonym.

Arabis lyrata var. *occidentalis* S. Wats. in A. Gray, Syn. Fl. N. Amer. 1¹: 159. 1895.

Arabis lyrata subsp. *kamtschatica* Fisch. ex Hultén, Fl. Aleut. Isl. 202. 1937; spelling altered from the original.

Perennial, glabrous or sparingly pubescent at base, the stems slender, branched at the base, 2–4 dm. high. Basal leaves 2–4 cm. long, lyrate-lyobed; stem leaves spatulate, entire or toothed; petals white, about 6 mm. long; fruiting pedicels ascending, about 1 cm. long; pods erect or nearly so, 2–3 cm. long, 1 mm. wide; stigma sessile or on a very short thick style; seeds oblong, wingless.

Wet rocky places, Boreal Zones; Alaska to northern Washington, Alberta, and Montana, also eastern Asia. Type locality: "in Kamchatka." May–Aug.

5. *Arabis Nuttallii* Robinson. Nuttall's Rock-cress. Fig. 2101.

Arabis Nuttallii Robinson in A. Gray, Syn. Fl. N. Amer. 1¹: 160. 1895.

Arabis spathulata Nutt. in Torr. & Gray, Fl. N. Amer. 1: 81. 1838. Not DC. 1821.

Biennial or usually perennial, more or less caespitose, the stems erect or ascending, 1–3 dm. high, sparingly hirsute toward the base. Basal leaves spatulate, short-petioled, 1–3 cm. long, entire; stem leaves oblanceolate, sessile; petals white, 4–6 mm. long; pedicels 8–15 mm. long, pods 1–3 cm. long, about 1 mm. broad, somewhat attenuate to a stout style; valves 1-nerved; seeds elliptical, wingless.

Arid Transition and Upper Sonoran Zones; eastern Washington to Montana and Utah. Type locality: "Lofty dry hills of the Platte, from the Black Mountains to the Central Chain." May–July.

6. *Arabis macella* Piper. Piper's Rock-cress. Fig. 2102.

Arabis macella Piper, Proc. Biol. Soc. Wash. 33: 103. 1920.

Biennial from a stout taproot, the stems several, 4–5 dm. high, slender, simple, flexuous, sparsely pilose below, otherwise glabrous. Basal leaves spatulate-oblong, 3 cm. long, the blade longer than the margined petiole, ciliate on the margins; stem leaves oblong or linear; racemes 5–15 cm. long; pedicels spreading in fruit, 10–15 mm. long, glabrous; petals oblong-spatulate, white; pods erect, 15–20 mm. long, 1 mm. wide, somewhat compressed, glabrous; valves 3-nerved; style 1.5 mm. long; seeds in 1 row, wingless.

Upper Sonoran and Arid Transition Zones; known only from the vicinity of the type locality near Ritzville, Adams County, Washington. May–June.

7. *Arabis olýmpica* Piper. Olympic Rock-cress. Fig. 2103.

Arabis olympica Piper, Contr. U.S. Nat. Herb. 16: 208. 1913.

Arabis furcata var. *olympica* Rollins, Research Stud. St. Coll. Wash. 4: 19. 1936.

Perennial with a stout, slightly branched caudex, the stems 5–10 cm. high, pubescent with 2-forked hairs. Basal leaves obovate to oblanceolate, more or less ciliate on the margins and pedicels with simple hairs, otherwise glabrous or with a few forked hairs along the midrib, the blade 5–10 mm. long, entire or slightly toothed, narrowed to a short winged petiole; stem leaves oblong to lanceolate, sessile, not auriculate, entire, pubescent on the margins and midrib; sepals 2 mm. long; petals white, equaling the sepals; fruiting pedicels 3–6 mm. long; pods erect, about 2 cm. long, 1 mm. wide, glabrous.

Known only from the type locality, "on grass covered talus slopes at the base of Mt. Olympus, near Hume's Glacier, 4,500 feet altitude," Washington. July–Sept.

8. *Arabis furcata* S. Wats. Cascade Rock-cress. Fig. 2104.

Arabis furcata S. Wats. Proc. Amer. Acad. 17: 362. 1879.

Arabis Suksdorfii Howell, Fl. N.W. Amer. 43. 1897.

Perennial, with a caespitose caudex, the stems erect or ascending, 1–3 dm. high, glabrous. Basal leaves ovate to oblong-lanceolate, 2.5–5 cm. long, sparingly toothed, often ciliate on the margins, otherwise glabrous; stem leaves sessile, oblong to linear, entire or sparingly toothed; petals white, 5–15 mm. long; pedicels 5–7 mm. long; pods 20–35 mm. long, attenuate to a rather short style; seeds oblong-elliptical, winged at the lower end.

Rocky bluffs, Transition Zone; Cascade Mountains, Washington and Oregon. Type locality: "Bluffs of the Columbia River, near the mouth of Hood River," Oregon. May–July.

9. *Arabis aculeolata* Greene. Waldo Rock-cress. Fig. 2105.

Arabis aculeolata Greene, Leaflets Bot. Obs. 2: 69. 1910.

Perennial from a very slender rootstock, hirsute throughout with simple hairs, the stems solitary or few, 10–15 cm. high, simple and slender. Basal leaves in a small rosulate tuft, obovate, spatulate to oblanceolate, 15–20 mm. long, entire or with a few teeth; stem leaves few, oblong, 5–6 mm. long, sessile, obtuse at apex; racemes short, few-flowered; calyx purple, 4 mm. long; petals purple, 10–15 mm. long; fruit erect, 4–6 cm. long, 1.5 mm. wide, attenuate at apex.

Rocky hillsides, Arid Transition Zone; Siskiyou Mountains near Waldo and Kirby, Josephine County, Oregon. Type locality: near Waldo, Oregon. April–June.

10. *Arabis Cusickii* S. Wats. Cusick's Rock-cress. Fig. 2106.

Arabis Cusickii S. Wats. Proc. Amer. Acad. 17: 363. 1879.

Biennial with a taproot and usually simple crown, the stems usually several, 1–2 dm. high, simple, glabrate above, hirsute below with mostly simple hairs. Basal leaves linear-lanceolate, 2–3 cm. long, hirsute and ciliate; stem leaves linear to linear-oblong, sessile, not auriculate; sepals villous; petals rose-colored, 6–10 mm. long; fruiting pedicels 10–14 mm. long; pods arcuate-ascending, 5–7 cm. long, 3 mm. wide, obtusish, glabrous; stigma sessile; valves 1-nerved below the middle; seeds in 1 row, orbicular, winged all around.

On rocky ridges, Arid Transition Zone; Spokane County, eastern Washington, to northeastern Oregon. Type locality: "on rocky ridges, Union County, Oregon." May–July.

11. *Arabis hirsuta* (L.) Scop. Hairy Rock-cress. Fig. 2107.

Turritis hirsuta L. Sp. Pl. 666. 1753.

Arabis hirsuta Scop. Fl. Carn. ed. 2: 30. 1772.

Arabis ovata Poir. in Lam. Encycl. Suppl. 5: 557. 1817.

Arabis rupestris Nutt. in Torr. & Gray, Fl. N. Amer. 1: 81. 1838.

Stems erect, nearly simple, 3–6 dm. high, hirsute or nearly glabrous. Basal leaves with margined petioles, obovate, dentate or repand, 2–5 cm. long; stem leaves sessile, auriculate, lanceolate or oblong; pedicels nearly erect to appressed, 6–12 mm. long in fruit; petals greenish white, 4–5 mm. long; pods narrowly linear, erect or appressed, 25–50 mm. long, about 1 mm. wide; style very short.

In rocky places, Boreal and Austral Zones; Alaska to New Brunswick, California, and Georgia; also in Europe and Asia. Type locality: Europe. May–Sept.

12. *Arabis Whitédii* Piper. Whited's Rock-cress. Fig. 2108.

Arabis Whitedii Piper, Bull. Torrey Club 28: 39. 1901.

Sandbergia Whitedii Greene, Leaflets Bot. Obs. 2: 136. 1911.

Perennial, the branches few to several from a slender taproot, the flowering stems 2–5 dm. high, simple or frequently branched, whole plant grayed with a coarse stellate pubescence. Basal leaves oblanceolate, tapering to an elongated petiole, 4–6 cm. long, 4–6 mm. wide; stem leaves oblanceolate, 2–3 cm. long, narrowed to the base, not auriculate; racemes becoming elongated, many-flowered; fruiting pedicels very slender, 8–15 mm. long; sepals 3 mm. long, stellate; petals white, 5 mm. long; pods 12–16 mm. long, 1 mm. wide; seeds wingless.

A locally distributed species known only from Wenatchee Flat, Kittitas County, and at the junction of Wilson and Crab Creeks, Douglas County, Washington. May–June.

13. *Arabis blepharophylla* Hook. & Arn. Coast Rock-cress. Fig. 2109.*Arabis blepharophylla* Hook. & Arn. Bot. Beechey 321. 1840.

Perennial with a simple or short-branched caudex, the stems few or several, 1–3 dm. high, glabrous or sometimes sparingly hirsute below with forked hairs. Basal leaves oblong to spatulate, 3–5 cm. long, ciliate on the margin with forked hairs, dentate or entire; stem leaves few, oblong, sessile; petals rose-colored, 10–12 mm. long, fragrant; sepals often colored, unequal, one pair gibbous and broader; fruiting pedicels stellate, 4–8 mm. long; pods erect or nearly so, 20–25 mm. long, about 2 mm. broad, abruptly beaked by a short stout style; seeds round-elliptic, narrowly winged or scarcely margined.

Rocky hillsides, mainly Upper Sonoran Zone; near the coast from Marin County to Monterey County, California. Type locality: central California, probably San Francisco. March–April.

14. *Arabis purpurascens* Howell. Purple Rock-cress. Fig. 2110.*Arabis purpurascens* Howell ex Greene, Pittonia 1: 161. 1888.*Arabis furcata* var. *purpurascens* S. Wats. in A. Gray, Syn. Fl. N. Amer. 1st: 161. 1895.

Perennial from a very slender rootstock, the flowering stems solitary or few, simple, 20–35 cm. high, sparsely pubescent with mostly 2-forked hairs. Basal leaves broadly oblanceolate to obovate, 2–7 cm. long, 8–20 mm. wide, narrowed to a petiole; entire or remotely toothed, rather sparsely pubescent with mostly 3-forked hairs; stem leaves several, oblong-elliptical, 15–50 mm. long, sessile, not cordate or auriculate, entire or saliently toothed, pubescent; racemes many-flowered; pedicels 5–12 mm. long, slender, pubescent; sepals purple, 5 mm. long, sparsely pubescent; petals purple, 12–15 mm. long; pods erect; pod 5 cm. long, slightly over 1 mm. broad, acute at apex, glabrous.

Rocky hillsides, Transition and Canadian Zones; Cascade and Siskiyou Mountains, Jackson County, Oregon. Type locality: rocky hillsides, Ashland, Oregon. May–July.

15. *Arabis Lyallii* S. Wats. Lyall's Rock-cress. Fig. 2111.*Arabis Drummondii* var. *alpina* S. Wats. Bot. King Expl. 17. 1871.*Arabis Lyallii* S. Wats. Proc. Amer. Acad. 11: 122. 1876.*Arabis Drummondii* var. *Lyallii* Jepson, Man. Fl. Pl. Calif. 429. 1925.

Perennial with a loosely branched caudex, the stems several, 5–30 dm. high, slender, glabrous throughout. Basal leaves spatulate to linear-oblanceolate, 15–60 mm. long; stem leaves narrowly lanceolate to oblong, sometimes scarcely auricled; sepals glabrous; petals rose-colored, 4–6 mm. long; pods erect or ascending, straight; 25–50 mm. long; about 2 mm. wide, narrowed to a short style; seeds in 1 row, orbicular, narrowly winged.

Alpine summits, Arctic-Alpine and Hudsonian Zones; British Columbia and western Montana to the Cascades and Blue Mountains, Oregon. Type locality: Ashnola River, Cascade Mountains, Washington. July–Sept.

The following species proposed by Greene (Leaflets Bot. Obs. 2: 75–76. 1910) are synonymous: *Arabis multiceps*, *A. armerifolia*, and *A. densa*.

16. *Arabis Drummondii* A. Gray. Drummond's Rock-cress. Fig. 2112.*Turritis stricta* Graham, Edinb. New Phil. Journ. 1829: 350. 1829. Not *Arabis stricta* Host. 1827.*Streptanthus angustifolius* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 76. 1838. Not *Arabis angustifolius* Lam. 1783.*Arabis Drummondii* A. Gray, Proc. Amer. Acad. 6: 187. 1864.

Biennial or rarely perennial, somewhat glaucous, glabrous or sparsely stellate-pubescent, with 2–3-forked hairs, the stems 1 to several, erect, 3–6 dm. high. Basal leaves narrowly oblanceolate, 2–5 cm. long, more or less pubescent with 2-forked appressed hairs; stem leaves linear-lanceolate to oblong, 2.5–5 cm. long; sepals narrow, 3–4 mm. long; petals white or pale rose, 6–8 mm. long; pods erect, crowded, 35–75 mm. long, 2–3 mm. wide; style obsolete; seeds broadly elliptical, winged on the lower end and sides.

In rocky places, Boreal Zones; British Columbia and Alberta to California and New Mexico. Type locality: Rocky Mountains. June–Aug.

The following species proposed by Greene are synonymous: *Arabis oxyphylla* and *A. connexa* (Pittonia 4: 196–197. 1910); *Arabis nemophila* and *A. interposita* (Leaflets Bot. Obs. 2: 78. 1910).

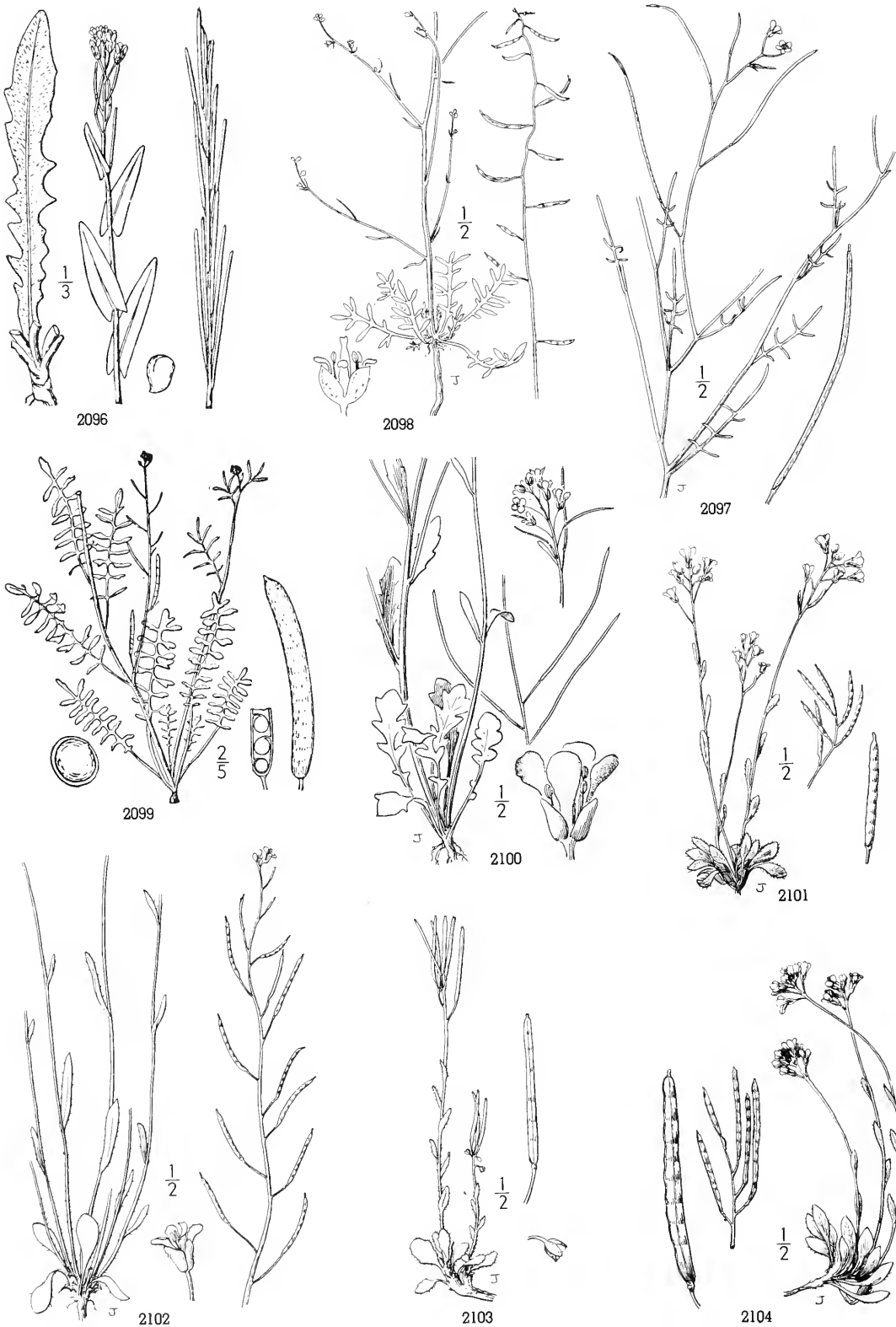
17. *Arabis Bolanderi* S. Wats. Bolander's Rock-cress. Fig. 2113.*Arabis Bolanderi* S. Wats. Proc. Amer. Acad. 22: 467. 1887.

Biennial, the stems solitary, 3–5 dm. high, branched above, with ascending branches, stellate-pubescent, becoming glabrous or nearly so above. Basal leaves narrowly oblanceolate, petioled, the margins revolute; stem leaves lanceolate, 2–4 cm. long, more or less auriculate at base, usually stellate-pubescent; racemes many-flowered, divergent or somewhat recurved; sepals 3 mm. long, pubescent; petals 5 mm. long, rose-colored; fruiting pedicels divergent or somewhat recurved, 3–4 mm. long, pubescent or glabrate; pods straight, divergent or slightly reflexed, 2–3 cm. long, 1 mm. wide; seeds broadly elliptical, narrowly winged, somewhat in 2 rows.

Mountain slopes, Arid Transition Zone; central Sierra Nevada, California. Apparently a local species and seldom collected. Type locality: Big Trees, Yosemite National Park. May–July.

18. *Arabis acutina* Greene. Sharp-podded Rock-cress. Fig. 2114.*Arabis acutina* Greene, Leaflets Bot. Obs. 2: 82. 1910.

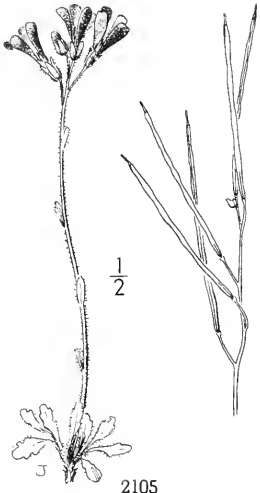
Short-lived perennial, stems few from the crown of a rather slender taproot, erect and



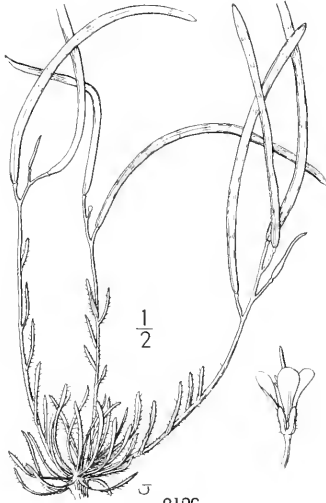
2096. *Turrilis glabra*
2097. *Arabis filifolia*
2098. *Arabis deserti*

2099. *Arabis virginica*
2100. *Arabis lyrata*
2101. *Arabis Nuttallii*

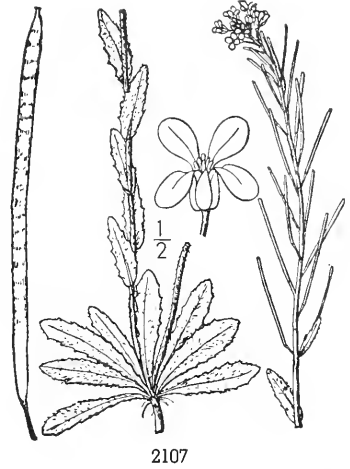
2102. *Arabis macella*
2103. *Arabis olympica*
2104. *Arabis furcata*



2105



2106



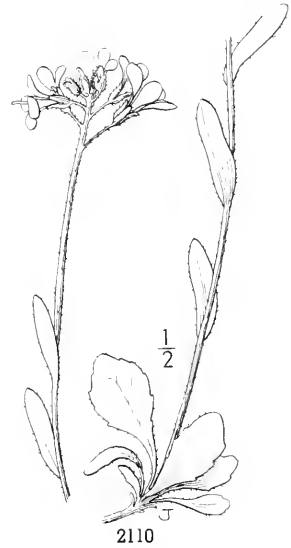
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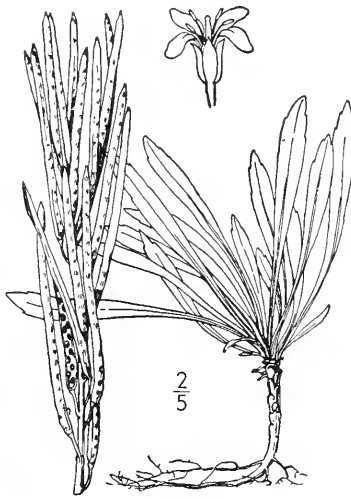
2109



2110



2111



2112



2113

2105. *Arabis aculeolata*
2106. *Arabis cusickii*
2107. *Arabis hirsuta*

2108. *Arabis whitedii*
2109. *Arabis blepharophylla*
2110. *Arabis purpurascens*

2111. *Arabis lyallii*
2112. *Arabis drummondii*
2113. *Arabis bolanderi*

simple, 15–30 cm. high, sparsely pubescent with 3-forked hairs. Basal leaves oblanceolate, 10–15 mm. long, pale, stellate with 3-forked hairs; stem leaves oblong, 10–12 mm. long, auriculate, glabrous or nearly so, pods straight, ascending on rather long diverging pedicels, 2.5–5 cm. long, 1.5 mm. wide, narrowed at apex to a slender beak, the valves smooth with no trace of a midrib; seeds in 1 row, oval, narrowly winged at the upper end.

Dry rocky slopes, Boreal Zones; Cascade Mountains, Oregon. Type locality: Mount Thielson, Cascade Mountains, Oregon. June–Sept.

19. *Arabis microphylla* Nutt. Small-leaved Rock-cress. Fig. 2115.

Arabis microphylla Nutt. in Torr. & Gray. Fl. N. Amer. 1: 82. 1838.

Arabis tenuicula Greene, Leaflets Bot. Obs. 2: 82. 1910.

Perennial, with a slender branching caudex, the stems several, erect, 1–3 dm. high, very slender, somewhat stellate at base or glabrous. Leaves oblanceolate or spatulate, 5–30 mm. long, entire, densely stellate-pubescent; petals usually white, 3 mm. long; fruiting pedicels 5–10 mm. long, ascending; pods ascending, 2–4 cm. long, 1–1.5 mm. wide; style obsolete; seeds in 1 row, slightly winged at apex.

Dry mountain slopes, mainly Arid Transition Zone; Klickitat County, Washington, and Wasco County, Oregon, to Montana, Utah, and Nevada. Type locality: "Rocky Mountains." June–Sept.

20. *Arabis platysperma* A. Gray. Broad-seeded Rock-cress. Fig. 2116.

Arabis platysperma A. Gray, Proc. Amer. Acad. 6: 519. 1865.

Arabis oligantha Greene, Rep. Nov. Spec. 5: 243. 1908.

Perennial with a branching rootstock, glaucous, more or less stellate throughout, the stems erect or ascending, 5–30 cm. high, simple or branched. Leaves all entire, the basal leaves oblanceolate, 2–3 cm. long, those of the stem oblong-lanceolate to linear-lanceolate, sessile; petals nearly white to rose, 4–6 mm. long; pedicels 5–15 mm. long; pods erect or a little spreading, 25–60 mm. long, 3–5 mm. wide; seeds orbicular, broadly winged.

Rocky or gravelly soils, Arid Transition and Canadian Zones; North Coast Ranges and Sierra Nevada to the San Jacinto Mountains, California. Type locality: "Sierra Nevada, on Mount Dana, alt. 13,227 feet, and above Ebbett's Pass," California. June–Aug.

Arabis inamoëna Greene, Rep. Nov. Spec. 5: 243. 1908. Perennial, with a caespitose caudex, the flowering stems 10–25 cm. high, pubescent below with forked hairs, sparsely so above. Basal leaves oblanceolate, 10–25 mm. long, 2–4 mm. wide, stellate-pubescent; stem leaves several, oblong, 5–15 mm. long, stellate-pubescent, not auriculate; racemes 3–4-flowered; pedicels 3–5 mm. long, sparsely pubescent or glabrous; sepals scarcely 3 mm. long, sparsely pubescent; petals white, 3 mm. long; pods erect, nearly 4 mm. wide, 4–5 cm. long, glabrous; seeds in 1 row, orbicular, broadly winged. Alpine slopes, Hudsonian Zone; southern Sierra Nevada, California. Type locality: Long Meadow, Tulare County, California. Doubtfully distinct from *Arabis platysperma* A. Gray.

21. *Arabis Howellii* S. Wats. Howell's Rock-cress. Fig. 2117.

Arabis Howellii S. Wats. Proc. Amer. Acad. 25: 124. 1890.

Arabis platyloba Greene, Pittonia 4: 198. 1900.

Arabis Leibergii Greene, Rep. Nov. Spec. 5: 243. 1908.

Arabis platysperma var. *Howellii* Jepson, Man. Fl. Pl. Calif. 432. 1925.

Perennial with a much branched caespitose caudex, glabrous except for a few cilia on the petioles; stems 3–15 cm. high, simple or branched. Leaves all narrowly oblanceolate, 15–25 mm. long, acute or obtuse, entire, glaucous, those of the stem somewhat clasping and more or less auriculate or cordate; petals rose-colored; pods erect, 3–5 cm. long, 4–5 mm. broad, acuminate; stigma sessile; seeds orbicular, broadly winged all around.

Summits of high peaks, Boreal Zones; Mount Hood, Oregon, south through the Cascade Mountains and the northern Sierra Nevada, California. Type locality: Ashland Butte, Jackson County, Oregon. June–Aug.

22. *Arabis Covillei* Greene. Coville's Rock-cress. Fig. 2118.

Arabis Covillei Greene, Rep. Nov. Spec. 5: 243. 1908.

Arabis conferta Greene, loc. cit.

Perennial with a branching rootstock, glabrous throughout except for a few cilia on the leaf bases, the stems somewhat tufted, simple or branched, including the fruiting pods 6–20 cm. high. Basal leaves oblanceolate to narrowly so, 15–25 mm. long; stem leaves usually 2–4, oblong, sessile, 6–12 mm. long; petals rose-purple or sometimes white, 4–5 mm. long; pods 4–6 cm. long, 4 mm. wide; seeds in 1 row, strongly winged all around.

Alpine slopes, Canadian Zone; central and southern Sierra Nevada, California, and the Washoe Mountains, Nevada. Type locality: near the lake on trail to White Chief Mine, 1,000 feet above Mineral King, Tulare County, California. July–Aug.

23. *Arabis Parishii* S. Wats. Parish's Rock-cress. Fig. 2119.

Arabis Parishii S. Wats. Proc. Amer. Acad. 22: 468. 1887.

Perennial, with a caespitose much branched caudex, finely stellate-pubescent throughout, the stems simple, 5–10 cm. high, slender. Basal leaves numerous, linear-oblanceolate, 5–15 mm. long, entire; stem leaves few, linear, sessile, not auriculate; sepals purplish, 3–4 mm. long; petals rose-colored, 6–8 mm. long; fruiting pedicels 4–6 mm. long; pods ascending, 2 cm. long, 2 mm. wide, attenuate at apex; style filiform, 4–6 mm. long; seeds elliptical, narrowly winged, somewhat in 2 rows.

Gravelly slopes, Arid Transition and Canadian Zones; San Bernardino Mountains, California. Type locality: Bear Valley, 6,500 feet altitude. May–July.

24. *Arabis repanda* S. Wats. Repand Rock-cress. Fig. 2120.*Arabis repanda* S. Wats. Proc. Amer. Acad. 11: 122. 1876.

Biennial, pubescent throughout with short mostly stellate hairs, the pubescence longer and simple at the base; the stems stout, 4-7 dm. high. Leaves narrowly obovate to oblanceolate, 3-10 cm. long, sparingly toothed or entire; the stem leaves narrowed to a winged petiole; petals white, narrow, 4-6 mm. long, little exceeding the sepals; pedicels rather stout, ascending, 2-4 mm. long; pods recurved-spreading, 6-8 cm. long, 3-3.5 mm. wide; seeds elliptical, broadly winged.

Open pine forests in gravelly or rocky places, Arid Transition Zone; central Sierra Nevada to the San Jacinto Mountains, California. Type locality: Yosemite Valley. May-July.

25. *Arabis pulchra* M. E. Jones. Beautiful Rock-cress. Fig. 2121.*Arabis pulchra* M. E. Jones, S. Wats. Proc. Amer. Acad. 22: 468. 1887.

Perennial with a branched woody caudex, canescent throughout with a fine stellate pubescence, the stems erect, 3-5 dm. high, leafy. Leaves not rosulate at base, the lower 25-50 mm. long, narrowly oblanceolate, petioled, entire, the upper linear-lanceolate and sessile; sepals pubescent; petals 6-12 mm. long, rose-colored; fruiting pedicels 5-15 mm. long; pods pendent, 3-6 cm. long, 3 mm. wide, finely stellate; stigma sessile; valves 1-nerved; seeds small, in 2 rows, orbicular, winged.

Arid rocky or gravelly slopes, Sonoran Zones; western Nevada and the Mojave and Colorado Deserts, southern California. Type locality: Empire City, Nevada. April-June.

26. *Arabis subpinnatifida* S. Wats. Klamath Rock-cress. Fig. 2122.*Arabis subpinnatifida* S. Wats. Proc. Amer. Acad. 20: 353. 1885.

Biennial or perennial, finely stellate-pubescent throughout, the stems usually several, 15-30 cm. high, rarely branched. Leaves silvery with a fine very dense stellate pubescence; the basal narrowly oblanceolate, entire or toothed, 25-50 mm. long; stem leaves lanceolate, sagittate at base, entire or unequally toothed; petals rose-colored, 6-12 mm. long; fruiting pedicels recurved, pubescent, 5-10 mm. long; pods 3-6 cm. long, 2-3 mm. wide, slightly arcuate and pendent, pubescent, attenuate to a short style; seeds in 1 row, orbicular, very narrowly margined.

Rocky and gravelly soils, Arid Transition Zone; Siskiyou Mountains of Oregon and California, east to northern Nevada. Type locality: "West Humboldt Mountains, Nevada." June-Aug.

27. *Arabis Beckwithii* S. Wats. Beckwith's Rock-cress. Fig. 2123.*Arabis Beckwithii* S. Wats. Proc. Amer. Acad. 22: 467. 1887.*Arabis subpinnatifida* var. *Beckwithii* Jepson, Man. Fl. Pl. Calif. 431. 1925.

Perennial, the stem solitary or several from the root crown, 2-3 dm. high, whole plant hoary with a fine, dense, stellate pubescence. Basal leaves narrowly oblanceolate, entire; stem leaves linear-lanceolate, sagittate-clasping but often obscurely so; sepals stellate-pubescent; petals 7-8 mm. long, rose-purple; pedicels arcuately recurved; pods mostly reflexed, 5-7 cm. long, 2 mm. wide, more or less stellate-pubescent, or subglabrous in age; stigma sessile or nearly so; seeds broadly winged.

Dry plains and hillsides, Arid Transition Zone; Deschutes County, eastern Oregon, to northeastern California and western Nevada. Type locality: Quartz Mountains, Nevada. May-July.

28. *Arabis suffrutescens* S. Wats. Woody Rock-cress. Fig. 2124.*Arabis suffrutescens* S. Wats. Proc. Amer. Acad. 17: 362. 1882.*Arabis duriuscula* Greene, Pittonia 4: 191. 1900.

Perennial with a caespitose caudex, the stems several, about 3 dm. high, glabrous. Basal leaves narrowly oblanceolate, 20-25 mm. long, glabrous or sparsely stellate-pubescent; stem leaves scarcely auriculate; flowers few; petals purplish, 6 mm. long; fruiting pedicels recurved, 8-12 mm. long; pods pendulous, 3-6 cm. long, 3-5 mm. wide, attenuate to a short, thick style; seeds orbicular, winged, in 2 rows.

Rocky soils, Arid Transition and Boreal Zones; Mount Adams, Washington, and in the Blue Mountains and Siskiyou Mountains, Oregon. Type locality: "Bluffs of the Snake River, Union County, Oregon." May-July.

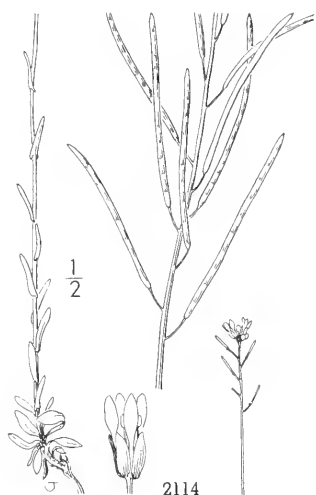
29. *Arabis glaucoválvula* M. E. Jones. Blue-podded Rock-cress. Fig. 2125.*Arabis glaucoválvula* M. E. Jones, Contr. West. Bot. No. 8: 40. 1898.

Perennial, stellate-canescens, with a caespitose caudex, the stems several, branched above, 2-4 dm. high. Basal leaves rather crowded, oblanceolate, petioled, 2.5-5 cm. long; stem leaves few, reduced, linear-lanceolate, sessile; sepals woolly-pubescent with scarious margins; petals purple, 8 mm. long; fruiting pedicels recurved, 4-8 mm. long; pods about 3 cm. long, 6 mm. wide, rounded at each end, pendulous, glabrous and glaucous; style stout; seeds in 2 rows, orbicular, with broad membranous wings.

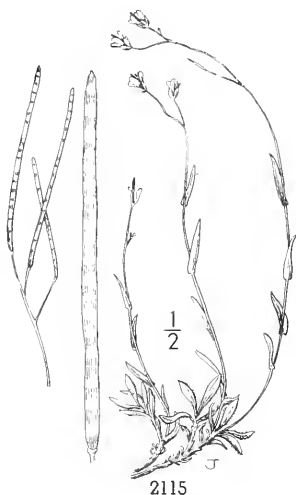
Gravelly places, Arid Transition and Upper Sonoran Zones; desert ranges of the Mojave Desert, from the Panamint to the San Bernardino Mountains, California. Type locality: "Darwin Mesa, Argus Mountains, California." April-June.

30. *Arabis perennans* S. Wats. Perennial Rock-cress. Fig. 2126.*Arabis perennans* S. Wats. Proc. Amer. Acad. 22: 467. 1887.*Arabis eremophila* Greene, Pittonia 4: 194. 1900.

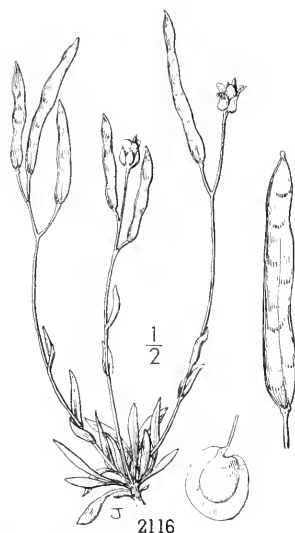
Perennial, with a branched and somewhat woody caudex, the stems 3-4 dm. high, roughly



2114



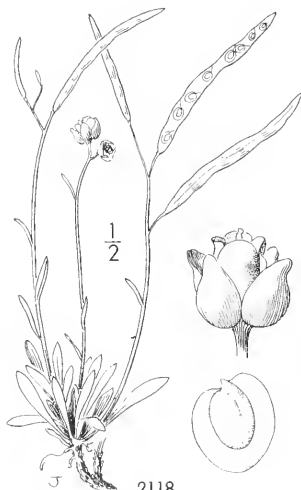
2115



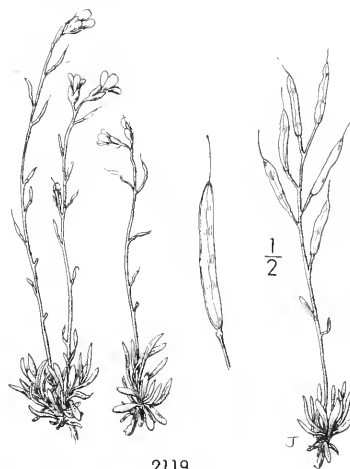
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2118



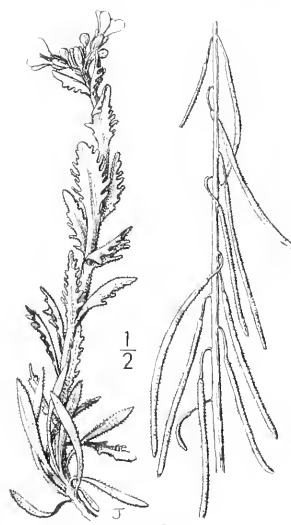
2119



2120



2121



2122

2114. *Arabis acutina*
 2115. *Arabis microphylla*
 2116. *Arabis platysperma*

2117. *Arabis Howellii*
 2118. *Arabis Covillei*
 2119. *Arabis Parishii*

2120. *Arabis repanda*
 2121. *Arabis pulchra*
 2122. *Arabis subpinnatifida*

stellate-pubescent, or glabrous above. Basal leaves 2-3 cm. long, broadly spatulate to narrowly oblanceolate, dentate, the petioles somewhat ciliate; stem leaves sagittate at base; petals pale rose, 4-5 mm. long; fruiting pedicels spreading; pods 4-6 cm. long, 1.5-2 mm. wide, arcuate; seeds in 1 row, orbicular, very narrowly margined.

Dry plains and valleys, Arid Transition and Upper Sonoran Zones; eastern Washington and northern Nevada to the desert ranges of southern California, east to Utah and Arizona. Type locality: "from northern Nevada and Utah to Arizona and the San Bernardino Mountains in California." April-June.

31. *Arabis atrorubens* Suksdorf. Black-flowered Rock-cress. Fig. 2127.

Arabis atrorubens Suksdorf ex Greene, *Erythra* 1: 223. 1893.

Arabis atriflora Suksdorf, *Deutsch. Bot. Monatss.* 16: 211. 1899.

Arabis sparsiflora var. *atrorubens* Rollins, *Research Stud. St. Coll. Wash.* 4: 25. 1936.

Stems erect, 3-8 dm. high, glabrous. Basal leaves oblanceolate, obtuse, dentate, scabrous-pubescent; stem leaves ovate to ovate-lanceolate, dentate or the upper entire, auriculate lobed; sepals and pedicels puberulent; petals 8 mm. long, dark purple, almost black; fruiting pedicels erect-spreading; pods at first nearly erect but soon slightly arcuate and spreading, 8-12 cm. long, 2-2.5 mm. wide, glabrous and nerveless; seeds in 1 row.

Rocky places, Arid Transition Zone; Kittitas and Klickitat Counties, eastern Washington. Type locality: western Klickitat County, Washington. April-May.

32. *Arabis Lemmonii* S. Wats. Lemmon's Rock-cress. Fig. 2128.

Arabis canescens var. *latifolia* S. Wats. *Bot. King Expl.* 17. 1871.

Arabis Lemmonii S. Wats. *Proc. Amer. Acad.* 22: 467. 1887.

Arabis latifolia Piper, *Contr. U.S. Nat. Herb.* 11: 295. 1906.

Arabis horizontalis Greene, *Leaflets Bot. Obs.* 2: 74. 1910.

Arabis polyclada Greene, *op. cit.* 2: 75.

Perennial, with a short caespitose caudex, the stems several, 8-20 cm. high, slender, glabrous or sparsely stellate-pubescent and glaucous above, hoary below with a fine densely stellate pubescence. Basal leaves spatulate-oblanceolate, 12-18 mm. long, entire or rarely with 1 or 2 teeth; stem leaves oblong-lanceolate, glabrous or nearly so; petals rose-colored; fruiting pedicels 2-6 mm. long, glabrous; pods ascending or spreading, somewhat arcuate, 25-40 mm. long, 1.5-2 mm. wide, attenuate to the short style; seeds orbicular, narrowly winged, in 1 row.

Rocky ground, Boreal Zones; British Columbia and Montana to the southern Sierra Nevada, California. Type locality: California, no definite locality mentioned. June-Aug.

33. *Arabis Brèweri* S. Wats. Brewer's Rock-cress. Fig. 2129.

Arabis Breweri S. Wats. *Proc. Amer. Acad.* 11: 123. 1876.

Perennial with a caespitose woody caudex, the stems several, 5-20 cm. high, villous with usually 2-3-forked hairs, or stellate below. Basal leaves 6-20 mm. long, oblanceolate, entire or few toothed, finely stellate-pubescent, the petioles ciliate; upper stem leaves lanceolate to narrowly oblong, obtusely auriculate or subcordate at base, somewhat pubescent, villous or glabrate; sepals tinged with purple, pubescent; petals deep rose-purple to nearly white, 6-8 mm. long; fruiting pedicels 5-8 mm. long, pubescent; pods at length spreading and more or less arcuate, 3-7 cm. long, 2 mm. wide, acute; stigma sessile; seeds orbicular, narrowly winged, in 1 row.

Rocky summits of mountain peaks, mainly Arid Transition Zone; California Coast Ranges, Siskiyou County to Santa Clara County. Type locality: Mount Diablo, California. April-June.

34. *Arabis Köehleri* Howell. Koehler's Rock-cress. Fig. 2030.

Arabis Koehleri Howell, *Fl. N.W. Amer.* 44. 1897.

Cespitose perennial, with a woody much branched caudex; flowering stems several, simple, 5-25 cm. high, glabrous or sparsely pubescent with forked hairs. Basal leaves rosulate, numerous, 1-2 cm. long, linear-lanceolate to oblanceolate, acutish, entire, cinereous with a dense stellate puberulence; stem leaves lanceolate, auriculate-clasping, 1-2 cm. long, sparsely pubescent with forked hairs; sepals oblong, 3-4 mm. long, purple, glabrous except for a few scattering stellate hairs above; petals spatulate, 8-10 mm. long, deep reddish purple; pedicels slender, 1-2 cm. long; pods erect-spreading and arcuate, 5-8 cm. long, 1.5-2 mm. wide, glabrous, narrowed at apex; seeds in 1 row, narrowly wing-margined.

Rocky cliffs, Transition Zone; western Oregon, from Douglas County to Josephine County. Type locality: bluffs along the Umpqua River, Roseburg, Oregon. March-April.

35. *Arabis sparsiflora* Nutt. Elegant Rock-rose. Fig. 2131.

Arabis sparsiflora Nutt. in Torr. & Gray, *Fl. N. Amer.* 1: 81. 1838.

Arabis arcuata var. *subvillosa* S. Wats. in A. Gray, *Syn. Fl. N. Amer.* 1^p: 164. 1895.

Arabis elegans A. Nels. *Bot. Gaz.* 30: 192. 1900.

Arabis perelegans A. Nels. in Coult. & Nels. *Man. Bot. Rocky Mts.* 228. 1909.

Biennial or short-lived perennial, the stems solitary or few from the root crown, 5-7 dm. high, glabrous to sparsely hirsute with mostly simple hairs. Basal leaves oblanceolate, 4-5 cm. long with a few serrate teeth, pubescent on both surfaces with few-forked hairs; stem leaves linear-lanceolate, auriculate-clasping, sparsely hirsute; racemes becoming much elongated in fruit; pedicels 5-10 mm. long, villous; corolla 12-15 mm. long, pale to dark purple; pods

arcuately spreading, 6–10 cm. long, 1.5 mm. wide, midvein obscure; stigma sessile; seeds in 1 row, narrowly winged all around.

Rocky places, Arid Transition and Upper Sonoran Zones; Columbia Basin, eastern Washington, to the Klamath Basin, northeastern California. Type locality: "Forests of the Rocky Mountains towards the sources of the Oregon." April–June.

36. *Arabis campyloblobo* Greene. Modoc Rock-cress. Fig. 2132.

Arabis campyloblobo Greene, Pittonia 4: 192. 1900.

Arabis arbuscula Greene, Leaflets Bot. Obs. 2: 77. 1910.

Short-lived perennial, the stems solitary or few from an unbranched, not at all woody crown, 4–6 dm. high, sparsely stellate-pubescent. Basal leaves oblanceolate, toothed or entire, densely stellate-pubescent; stem leaves linear-lanceolate, revolute, sagittate-clasping; fruiting pedicels divaricate, 4–6 mm. long, loosely stellate-pubescent; pods glabrous, arcuate, 4–8 cm. long, 2 mm. wide.

On gravelly slopes, mainly Arid Transition Zone; Grant County, eastern Oregon, to northeastern California, and adjacent Nevada. Type locality: near Yreka, California. May–July.

37. *Arabis máxima* Greene. Arched Rock-cress. Fig. 2133.

Streptanthus arcuatus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 77. 1838.

Arabis arcuata A. Gray, Proc. Amer. Acad. 6: 187. 1863. Not Shuttlw. 1852.

Arabis maxima Greene, Pittonia 4: 192. 1900.

Arabis Holboellii var. *arcuata* Jepson, Man. Fl. Pl. Calif. 430. 1925.

Perennial, stellate-pubescent throughout, the stems several, erect from a branching caudex, 4–8 dm. high, simple or branched. Basal leaves 25–60 mm. long, narrowly oblanceolate, acute, entire or repand-dentate, their petioles often ciliate; stem leaves linear to lanceolate, mostly entire; petals 6–12 mm. long, rose-colored; fruiting pedicels divaricate or recurved, 6–12 mm. long; pods arcuate, 5–7 cm. long, 2–3 mm. wide, acute; seeds orbicular, narrowly winged, as broad as the valves.

Rocky or gravelly ridges, Arid Transition Zone; South Coast Ranges and central Sierra Nevada, California, to northern Lower California. Type locality: "Shelving rocks on high hills near Santa Barbara," California. March–May.

38. *Arabis Hoffmannii* (Munz) Rollins. Hoffmann's Rock-cress. Fig. 2134.

Arabis maxima var. *Hoffmannii* Munz, Man. S. Calif. 205. 1935.

Arabis Hoffmannii Rollins, Madroño 3: 360. 1936.

Perennial, the stem solitary or usually several from the woody caudex, 5–7 dm. high, glabrous or sparsely pubescent with forked hairs toward the base, simple or branched above. Lower leaves crowded, linear-lanceolate, sinuate-dentate or entire, 5–10 cm. long, coriaceous, pubescent with forked hairs; stem leaves sessile and auriculate, glabrous above, pubescent beneath; sepals 4–5 mm. long, glabrous or nearly so; petals linear-oblong, 4–5 mm. long, white; fruiting racemes 2–4 dm. long; pedicels ascending, 1–4 cm. long; pods ascending, straight or becoming slightly arcuate, 5–10 cm. long, 2–3.5 mm. wide, glabrous and nerveless; styles short and stout; seeds in 2 rows, 1 mm. wide, narrowly winged.

Rocky ridges and cliffs, Upper Sonoran Zone; Santa Cruz Island, southern California. Type locality: sea cliffs east of Dick's Harbor. Feb.–April.

39. *Arabis rectissima* Greene. Bristly-leaved Rock-cress. Fig. 2135.

Arabis rectissima Greene, Pittonia 4: 191. 1900.

Arabis setigera Greene, Leaflets Bot. Obs. 2: 80. 1910.

Arabis Wyndii Henderson, Rhodora 32: 25. 1930.

Perennial, stems few from the root-crown, 4–5 dm. high, strictly erect, glabrous and glaucous, except for scattering 2-forked hairs near the base. Basal leaves oblanceolate, about 2 cm. long, ciliolate on the margins and somewhat setulose with simple and 2–3-forked hairs; stem leaves sessile, sagittate, oblong, 15–20 mm. long, the lower setulose, the upper glabrous; sepals 2.5 mm. long; petals white tinged with rose-purple, 4 mm. long; fruiting racemes 2–3 dm. long; pedicels reflexed, glabrous or thinly stellate-pubescent; pods strongly refracted, straight, 4–7 cm. long, 2–2.5 mm. wide, acute at apex, glabrous, the valves 1-nerved toward the base; seeds in 1 row, orbicular, narrowly winged all around, 1.5–1.7 mm. broad.

Open pine forests and edges of mountain meadows, Arid Transition Zone; Cascade Mountains, Klamath County, Oregon, to the southern Sierra Nevada, California. Type locality: middle elevations of the mountains of Fresno County, California. June–July. Rector's Rock-cress.

40. *Arabis Holboellii* Hornem. Holboell's Rock-cress. Fig. 2136.

Arabis Holboellii Hornem, Fl. Dan. 2: 5. pl. 1879. 1827.

Arabis retrofracta Graham, Edinb. New Phil. Journ. 344. 1829.

Turritis retrofracta Hook. Fl. Bor. Amer. 1: 41. 1829.

Biennial or perennial, the stems simple or branched, 3–5 dm. high, stellate-pubescent below. Basal leaves oblanceolate, 1–3 cm. long, entire, densely stellate-pubescent; stem leaves lanceolate, entire, sagittate at base, sparsely stellate-pubescent or the upper glabrous; sepals stellate-pubescent; petals 6–8 mm. long, white or rose-colored; fruiting pedicels 1 cm. long, reflexed; pods straight, 4–8 cm. long, 1.5–2 mm. wide, obtuse at apex, glabrous; seeds orbicular, narrowly winged, in 2 rows in each cell.

Usually gravelly or rocky places, Boreal Zones; Alaska to Greenland, south to Washington, Lake Superior, and Quebec. In Washington it is found in the Cascade Mountains as far south as Mount Rainier. Type locality: on rocks, Disco Island, Greenland. June–Aug.

41. *Arabis secúnda* Howell. Second Rock-cress. Fig. 2137.

Arabis secunda Howell, *Erythea* 3: 33. 1895.

Arabis Holboellii var. *secunda* Jepson, *Man. Fl. Pl. Calif.* 430. 1925.

Stems slender, densely stellate-pubescent, often glabrate above. Basal leaves linear-lanceolate, entire, remotely toothed, densely stellate-pubescent; sepals 2–3 mm. long; petals 5–7 mm. long, pink; pedicels slender, pubescent; pods closely reflexed, pubescent or sometimes glabrous, 3–7 cm. long, barely over 1 mm. wide or less; seeds in 1 row in each cell.

Dry gravelly flats and ridges, Arid Transition and Canadian Zones; eastern Washington to southern California. Type locality: Mount Adams, Washington. May–July.

42. *Arabis pubérula* Nutt. Blue Mountain Rock-cress. Fig. 2138.

Arabis puberula Nutt. in Torr. & Gray, *Fl. N. Amer.* 1: 82. 1838.

Arabis canescens Nutt. in Torr. & Gray, *Fl. N. Amer.* 1: 83. 1838.

Arabis tennis Greene, *Pittonia* 4: 189. 1901.

Perennial with a densely caespitose caudex, the stems 2–3 dm. high, finely stellate-pubescent. Basal leaves linear-oblancoolate, 15–25 mm. long, entire, densely stellate-canescens; stem leaves linear, slightly auriculate; petals pale purplish, 4 mm. long; fruiting pedicels recurved, 2–6 mm. long; pods pendulous, 3–5 cm. long, 1.5–2 mm. wide; seeds small, winged, in 2 rows.

Dry hillsides, Arid Transition Zone; eastern Washington and Oregon to Montana and Wyoming. Type locality: "Forests of the Blue Mountains of Oregon." April–July.

47. *ERÝSIMUM* L. Sp. Pl. 660. 1753.

Annual, biennial or perennial herbs, rarely suffruticose, more or less pubescent with 2-forked hairs, the leaves simple, entire, toothed or lobed. Flowers yellow, in terminal racemes. Siliques linear, elongated, 4-angled or nearly terete; valves deciduous, strongly keeled by a prominent midvein. Stigma lobed, the lobes produced above the placentae. Seeds oblong, in 1 row in each cell; cotyledons incumbent or accumbent. [Name Greek, meaning blister drawing.]

A genus of about 90 species, widely distributed through the north temperate zone. Type species, *Erysimum cheiranthoides* L.

Pods terete or 4-angled or obscurely compressed; seeds not winged or if so only at the apex; cotyledons incumbent.

Petals 4–8 mm. long.

Fruiting pedicels very slender, 10 mm. long; pods ascending, 15–25 mm. long; annual.

Fruiting pedicels stout, 3–5 mm. long; pods 3–8 cm. long.

Pods divaricately spreading, 6–8 cm. long; annual.

Pods erect, 3–4 cm. long, canescent; perennial.

Petals 10–15 mm. long.

Biennials or short-lived perennials, the flowering stems arising from the root crown or short caudex.

Suffrutescent insular perennial.

Pods flattened parallel with the partition.

Style slender, 2 mm. long.

Seeds neither winged nor margined; leaves oblanceolate, mostly basal; cotyledons incumbent.

Seeds distinctly winged all around; leaves narrowly linear, usually abundant on the stem; cotyledons accumbent.

Style short and stout; seeds more or less conspicuously winged all around; cotyledons accumbent; coastal species.

Leaves oblanceolate, not fleshy.

Leaves spatulate, with elongated petioles; fleshy.

1. *E. cheiranthoides*.

2. *E. repandum*.

3. *E. inconspicuum*.

4. *E. capitatum*.

5. *E. insulare*.

6. *E. perenne*.

7. *E. occidentale*.

8. *E. concinnum*.

9. *E. Menziesii*.

1. *Erysimum cheiranthoides* L. Wormseed or Treacle Mustard. Fig. 2139.

Erysimum cheiranthoides L. Sp. Pl. 661. 1753.

Cheirinia cheiranthoides Link. *Enum. Hort. Ber.* 2: 170. 1820.

Cheiranthus cheiranthoides Heller, *Cat. N. Amer. Pl.* 4. 1898.

Annual, the stems erect, simple or branching, 2–5 dm. high, sparsely puberulent. Leaves lanceolate or oblanceolate, 25–50 mm. long, entire or inconspicuously dentate; petals yellow, 4–5 mm. long; pods glabrous or essentially so, 1–1.5 mm. broad, nearly erect; valves keeled; style slender, 1 mm. long; seeds not winged; cotyledons incumbent.

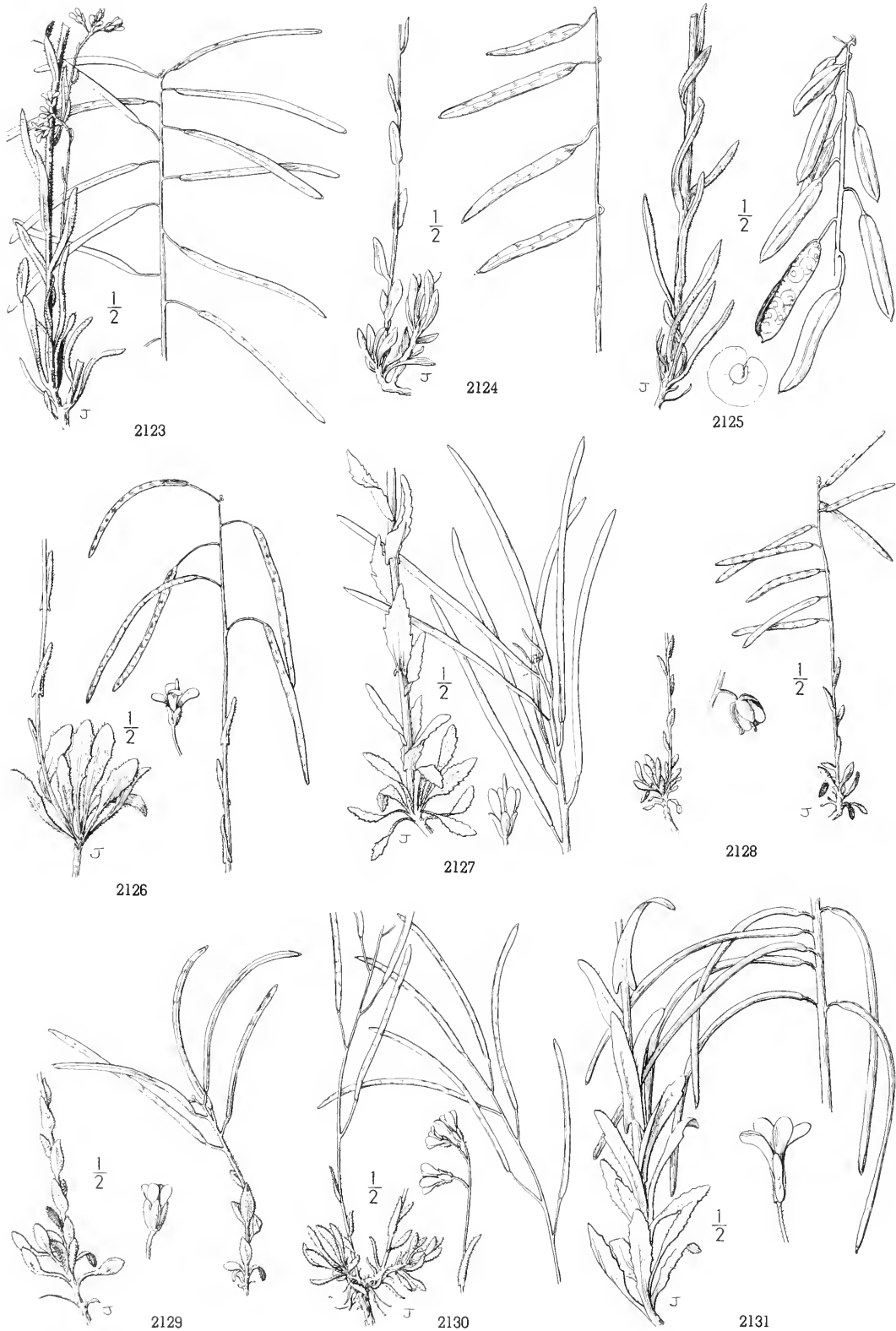
Roadsides and waste places, Boreal and Upper Sonoran Zones; Alaska to Newfoundland, south to northern California, Utah, and North Carolina, also in Europe. Type locality: European. June–Aug.

2. *Erysimum repándum* L. Repand Wallflower. Fig. 2140.

Erysimum repandum L. *Amoen. Acad.* 3: 415. 1756.

Annual, minutely pubescent, the stems simple or usually much branched, 1–3 dm. high. Leaves lanceolate to linear-lanceolate, 3–6 cm. long, repand-denticulate; petals 6–8 mm. long, yellow; fruiting pedicels very stout, 2–3 mm. long; pods 4-sided, 1.5–2 mm. thick; beak short and stout; seeds not winged; cotyledons incumbent.

Roadsides and waste places, Arid Transition and Upper Sonoran Zones; eastern Washington and Oregon to central California, eastward to the Atlantic States. Native of Europe. May–June.



2123. *Arabis Beckwithii*
2124. *Arabis suffrutescens*
2125. *Arabis glaucovalvula*

2126. *Arabis perennans*
2127. *Arabis atrorubens*
2128. *Arabis Lemmonii*

2129. *Arabis Breweri*
2030. *Arabis Koehleri*
2131. *Arabis sparsiflora*



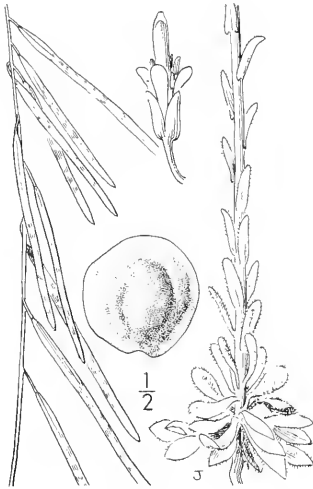
2132



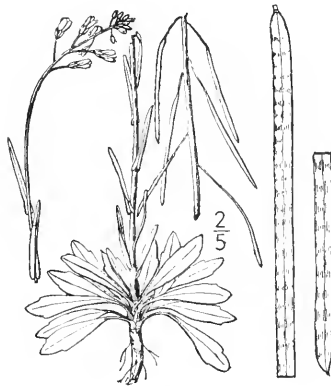
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2134



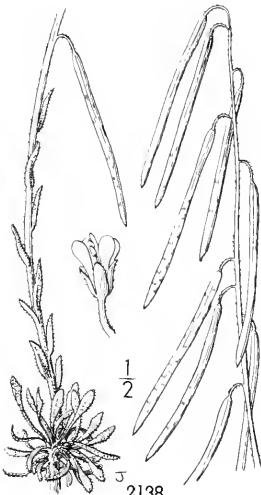
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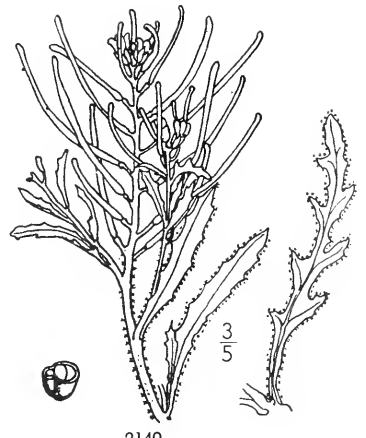
2137



2138



2139



2140

2132. *Arabis campyloblobo*
2133. *Arabis maxima*
2134. *Arabis Hoffmannii*

2135. *Arabis rectissima*
2136. *Arabis Holboellii*
2137. *Arabis secunda*

2138. *Arabis puberula*
2139. *Erysimum cheiranthoides*
2140. *Erysimum repandum*

3. *Erysimum inconspicuum* (S. Wats.) MacM. Small-flowered Prairie-rocket. Fig. 2141.

Erysimum parviflorum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 95. 1838. Not Pers.

Erysimum asperum var. *inconspicuum* S. Wats. Bot. King Expl. 24. 1871.

Erysimum inconspicuum MacM. Met. Minn. 268. 1892.

Perennial, the whole plant canescent, stems erect, simple or sparingly branched, 3–6 dm. high. Leaves linear to oblanceolate, 25–75 mm. long, entire or dentate; petals yellow, 6–8 mm. long; fruiting pedicels stout, 4–6 mm. long, ascending; pod erect, 2–4 cm. long, 2 mm. wide, canescent; style 1–2 mm. long, nearly as thick as the pod.

Dry plains, Arid Transition and Upper Sonoran Zones; Alaska and Ontario south to Nevada, Colorado, and Kansas. In the Pacific States occurring in eastern Washington and Oregon. Type locality: Diamond Valley, Nevada. May–July.

4. *Erysimum capitatum* (Dougl.) Greene. Douglas' Wallflower. Fig. 2142.

Cheiranthus capitatus Dougl. in Hook. Fl. Bor. Amer. 1: 38. 1829.

Erysimum elatum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 95. 1838.

Erysimum capitatum Greene, Fl. Fran. 269. 1891.

Cheiranthus elatus Greene, Pittonia 3: 135. 1896.

Cheirinia elata Rydb. Bull. Torrey Club 39: 323. 1912.

Biennial, rough-pubescent and more or less densely canescent, 3–10 dm. high, simple or with a few branches above. Basal leaves lanceolate or linear tapering into the petiole, dentate or entire; stem leaves, at least the upper, sessile; petals yellow or commonly orange, 15–20 mm. long; fruiting pedicels stout, 4–6 mm. long, spreading; pods narrowly linear, 4–10 cm. long, 2 mm. wide, 4-angled and only slightly compressed, rough-pubescent; styles short and thick; seeds oblong-ellipsoid, often winged at the apex.

Open hillsides, Transition and Upper Sonoran Zones; British Columbia to northern California, east to Idaho. Type locality: "on rocky places of the Columbia near the sea, and at Puget Sound." March–Aug.

This species is closely related to *Erysimum asperum* (Nutt.) DC. of the Rocky Mountain and Great Plains regions, and might be considered as a subspecies. The name has been misapplied to the flat-podded species of coastal California.

5. *Erysimum insulare* Greene. Island Wallflower. Fig. 2143.

Erysimum insulare Greene, Bull. Torrey Club 13: 218. 1886.

Cheiranthus insularis Greene, Pittonia 3: 131. 1896.

Shrubby, diffusely branching, forming a dense tuft about 3 dm. high, and 0.5–2 m. broad, cinereous with a minute appressed pubescence of 2-forked hairs. Leaves crowded upon the numerous woody branches, narrowly linear, entire, firm; racemes short and dense, short-pedunculate or subsessile; petals yellow, about 15 mm. long; pods linear 5 cm. long, 3–4 mm. thick, quadrangular, style stout; seeds not winged.

Sandy slopes, San Miguel and Santa Rosa Islands, southern California. Type locality: sandy slopes above Cuyler's Harbor, San Miguel Island. March–July.

6. *Erysimum perenne* (S. Wats.) Abrams. Sierra Wallflower. Fig. 2144.

Erysimum asperum var. *perenne* S. Wats. ex Coville, Proc. Biol. Soc. Wash. 7: 70. 1892.

Cheiranthus perennis Greene, Pittonia 3: 132. 1896.

Erysimum nevadense Heller, Muhlenbergia 1: 52. 1904.

Perennial, the crown of the root clothed with the remains of old leaves, whole plant green and only sparingly puberulent. Basal and lower stem leaves oblanceolate, 3–5 cm. long, the blade inconspicuously runcinate-dentate, shorter than the slender petiole; upper leaves narrowly oblanceolate and short-petioled; petals yellow, about 15 mm. long; fruiting pedicels ascending, about 1 cm. long; pods ascending or somewhat spreading, 6–7 cm. long, 2 mm. wide, flattened; beak slender, 3–4 mm. long; seeds not winged or inconspicuously so at one end; cotyledons incumbent but slightly oblique.

Stony alpine slopes, Boreal Zones; Sierra Nevada, California. Type locality: between Mineral King and Farewell Gap, Sierra Nevada. June–Aug.

7. *Erysimum occidentale* (S. Wats.) Robinson. Western Wallflower. Fig. 2145.

Erysimum asperum var. *pumilum* S. Wats. Bot. King Expl. 24. 1871.

Cheiranthus occidentalis S. Wats. Proc. Amer. Acad. 23: 261. 1888.

Erysimum occidentale Robinson in A. Gray, Syn. Fl. N. Amer. 1²: 144. 1895.

Cheirinia occidentalis Tidestrom, Contr. U.S. Nat. Herb. 25: 246. 1925.

Biennial, 1–3 dm. high, stem solitary or sometimes several from the same taproot, leafy, cinereous throughout. Basal leaves numerous, linear, tapering to the petiole; stem leaves many, similar to the basal, but short-petioled, or the uppermost sessile; racemes densely flowered; petals pale yellow, 15–20 mm. long; fruiting pedicels stout, 6–10 mm. long, ascending; pods ascending, 7–10 cm. long, flattened, 3 mm. broad; style rather slender, 2–3 mm. long; seeds distinctly winged all around.

Dry plains and hillsides, Upper Sonoran Zone; southeastern Washington through eastern Oregon and Idaho to Nevada. Type locality: Klickitat County, Washington. May–July.

8. *Erysimum concinnum* Eastw. Coast Wallflower. Fig. 2146.

Erysimum concinnum Eastw. Zoe 5: 103. 1901.

Erysimum ammophilum Heller, Muhlenbergia 8: 96. 1912.

Erysimum capitatum of authors. Not *Cheiranthus capitatus* Dougl.

Biennial or short-lived perennial from a deep taproot, the stems stout, 15–20 cm. high, simple. Basal and lower stem leaves 5 cm. long, oblanceolate, tapering to broad margined petioles as long as the blades, runcinate-dentate or entire, green but finely appressed-pubescent with 2-forked hairs; upper leaves lanceolate, sessile or nearly so; inflorescence at first a crowded capitate corymb, becoming a short corymbose raceme in fruit; petals 2–3 cm. long, canary yellow; fruiting pedicels stout, 7–15 mm. long, divaricate-spreading, or the lower somewhat recurved, pods 8–15 cm. long, ascending or spreading, 2–5 mm. broad, flattened; beak short and stout; seeds winged all around; cotyledons accumbent.

Coastal region; southern Oregon to Point Conception, California. Type locality: near Mendocino, Mendocino County, California. March–June.

Erysimum concinnum subsp. *suffrutescens* Abrams. (*Cheiranthus suffrutescens* Abrams, Bull. S. Calif. Acad. 2: 41. 1903.) Plants suffrutescent and branched below, often straggling, 4–10 dm. long. Leaves narrowly linear-ob lanceolate; petals yellow; pods widely spreading, 5–6 cm. long, 1.5–2 mm. wide, compressed but somewhat 4-angled; seeds compressed, narrowly winged all around the margin.

Sand dunes along the coast of southern California. Type locality: near Playa del Rey, Los Angeles County, California. This coastal species displays marked local variations over its range and possibly more subspecies should be recognized than this extreme southern variation.

9. *Erysimum Menziesii* (Hook.) Wettst. Menzies' Wallflower. Fig. 2147.

Hesperis Menziesii Hook. Fl. Bor. Amer. 1: 60. 1830.

Erysimum grandiflorum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 96. 1838.

Erysimum Menziesii Wettst. Oest. Bot. Zeitschr. 39: 283. 1881.

Cheiranthus grandiflorus Heller, Muhlenbergia 1: 145. 1906.

Perennial from an elongated taproot, the caudex usually simple, 1–6 cm. high, often densely clothed with the old leaf bases; flowering stems usually several, 1–10 cm. high. Basal leaves spatulate, narrowed to an elongated petiole, entire or obscurely few-toothed; racemes short and crowded in flower, 1–3 cm. long in fruit; pedicels 2–5 cm. long; petals yellow, 15–18 mm. long, with rounded or broadly oval blades; capsule ascending or spreading, flattened, 4–8 cm. long, 2.5–3.5 mm. wide; style stout, scarcely 1 mm. long; stigma lobes prominent, diverging; seeds narrowly winged.

Sand dunes and beaches, Transition Zone; Mendocino, Sonoma, and Monterey Counties, California. Type locality: Monterey Peninsula, California. Flowering nearly throughout the year.

48. *KÖNIGA* Adans. Fam. Pl. 2: 420. 1763.

Perennial herbs, pubescent or canescent with forked hairs, with entire leaves, and small white flowers in terminal racemes. Petals obovate, entire. Filaments slender, with 2 small glands at the base. Silicle compressed, oval or orbicular, dehiscent. Seeds 1 in each cell; cotyledons accumbent. [Name in honor of Charles König, a curator in the British Museum.]

A genus of 4 species, natives of the Mediterranean region. Type species, *Königa maritima* (L.) R. Br.

1. *Königa maritima* (L.) R. Br. Sweet Alyssum. Fig. 2148.

Clypeola maritima L. Sp. Pl. 652. 1753.

Alyssum maritimum Lam. Encycl. 1: 98. 1783.

Königa maritima R. Br. in Denh. & Clapp, Narr. Exp. Afric. 214. 1826.

Ascending or sometimes procumbent, freely branching, 1–3 dm. high, minutely pubescent with appressed hairs. Basal leaves oblanceolate, narrowed into a petiole; flowers white, fragrant, about 4 mm. broad; fruiting pedicels ascending, 6–8 mm. long.

An escape from gardens, along streets and in waste places; native of southern Europe. Flowering nearly throughout the year.

49. *ALÝSSUM* [Tourn.] L. Sp. Pl. 650. 1753.

Low branching stellate-pubescent annual or perennial herbs, with small racemose yellow flowers. Filaments often dilated and toothed or appendaged. Stamens 6. Stigma nearly entire. Silicle ovate, oblong or orbicular, compressed; valves nerveless, dehiscent; septum thin. Seeds 1 or 2 in each cell, wingless; cotyledons accumbent. [Greek, meaning curing madness.]

About 100 species, natives of the Old World. Type species, *Alyssum montanum* L.

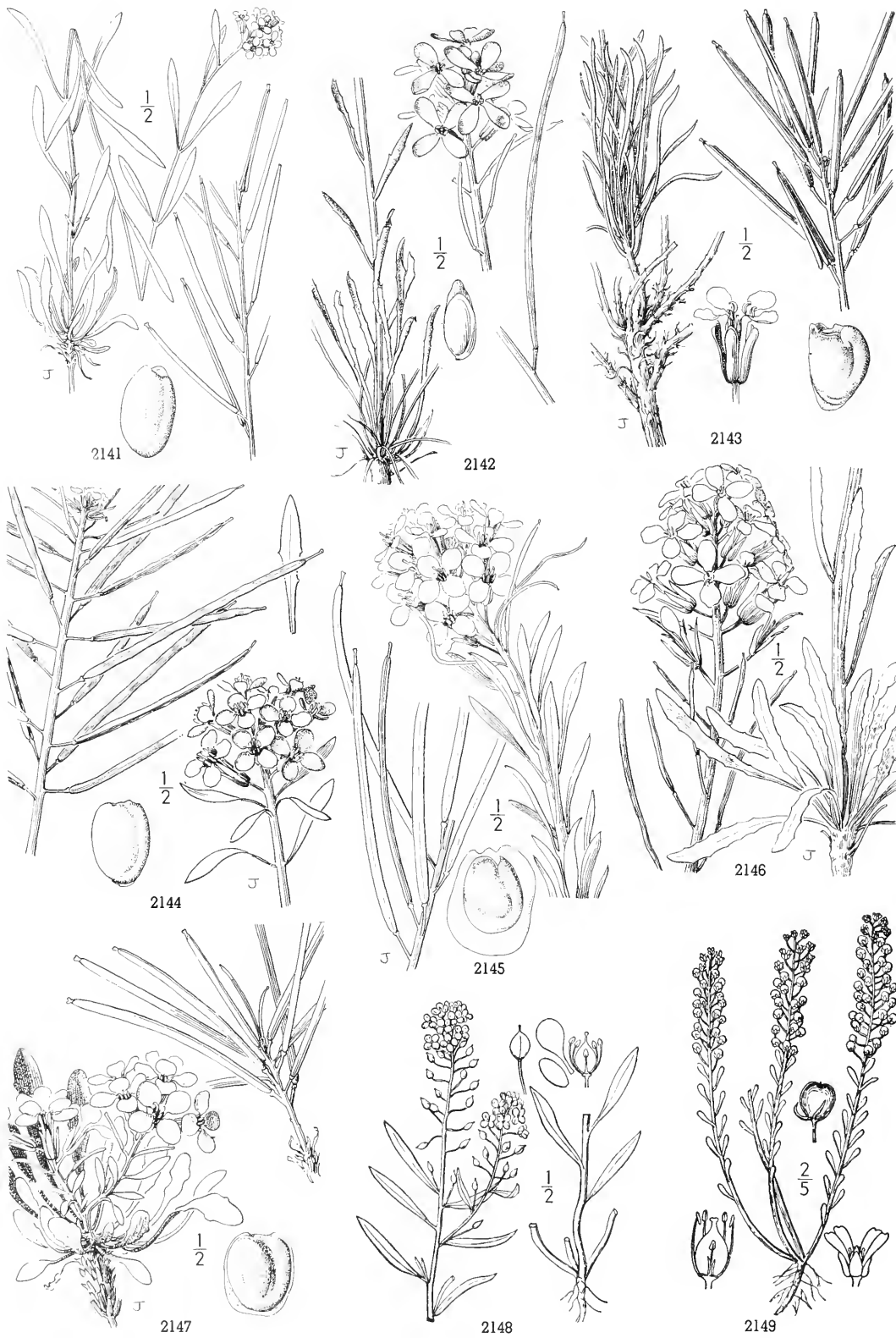
1. *Alyssum alyssoides* L. Yellow Alyssum. Fig. 2149.

Clypeola alyssoides L. Sp. Pl. 652. 1753.

Alyssum alyssoides L. Syst. Veg. ed. 10. 1130. 1759.

Alyssum calycinum L. Sp. Pl. ed. 2. 908. 1763.

Annual, usually branching from the base, erect, 10–30 cm. high, stellate-pubescent through-



2141. *Erysimum inconspicuum*
2142. *Erysimum capitatum*
2143. *Erysimum insulare*

2144. *Erysimum perenne*
2145. *Erysimum occidentale*
2146. *Erysimum concinnum*

2147. *Erysimum Menziesii*
2148. *Koniga maritima*
2149. *Alyssum alyssoides*

out. Leaves entire, spatulate, 1–2 cm. long; flowers in racemes 5–15 cm. long; petals pale yellow, cuneate, 2–3 mm. long; pods on spreading pedicels, orbicular, 3 mm. broad, margined, notched at the apex.

An introduced plant, becoming well established in various sections of the Pacific States. Native of Europe. April–July.

50. *HESPERIS* [Tourn.] L. Sp. Pl. 663. 1753.

Erect perennial or biennial herbs, pubescent with forked hairs, the leaves simple. Flowers showy, rose-purple or white, in terminal racemes. Sepals erect, the lateral saccate at base. Petals with broad nearly orbicular blades and slender claws. Pods elongated, nearly terete, torulose; valves dehiscent, keeled, 1-nerved; the partition wall reticulated. Seeds in 1 row in each cell, spherical, wingless; cotyledons incumbent. [Name from *Hesperus*, evening, when the flowers are most fragrant.]

About 25 species, natives of Europe and Asia. Type species, *Hesperis matronalis* L.

1. *Hesperis matronalis* L. Dame's Rocket. Fig. 2150.

Hesperis matronalis L. Sp. Pl. 663. 1753.

Stems erect, branched above, 3–10 dm. high. Leaves ovate or ovate-lanceolate, serrate, pubescent; petals rose-purple or white; pods slender, spreading, 5–10 cm. long.

Occasionally escaped from gardens, especially in western Washington and Oregon. Native of Europe and Asia. May–July.

51. *MATTHIOLA* R. Br. in Ait. Hort. Kew. ed. 2. 4: 119. 1812.

Biennial or perennial herbs with stellate pubescence. Flowers often showy. Sepals erect, the lateral saccate at base. Petals with broad rounded blades and elongated claws. Stigma lobes usually prominent, often corniculate, produced above the placentae. Pods elongated, linear, more or less compressed, the partition wall reticulate. Seeds in 1 row, marginless; cotyledons incumbent. [Name in honor of Peter Andrew Matthioli, Italian physician and botanist.]

A genus of about 50 species, natives of western Asia and the Mediterranean region. Type species, *Matthiola incana* (L.) R. Br.

1. *Matthiola incana* (L.) R. Br. Stock. Fig. 2151.

Cheiranthus incanus L. Sp. Pl. 662. 1753.

Matthiola incana R. Br. in Ait. Hort. Kew. ed. 2. 4: 119. 1812.

Stout erect branching biennial or short-lived perennial, cinereous throughout with a short stellate tomentum. Leaves narrowly oblong or linear, entire; flowers showy, purple varying to white; pods often 10–12 cm. long.

Escaped from gardens and established along the coast in central and southern California. Native of southern Europe. April–May.

Chorispora tenella (Pall.) DC. Syst. 2: 435. 1821. Glandular-puberulent annual, the stems 1–3.5 dm. high, branching. Basal leaves oblanceolate, petioled, sinuate-toothed, 2.5–7 cm. long; stem leaves dentate to entire, short-petioled; sepals oblong, 3–5 mm. long; petals purple, 10–13 mm. long, oblanceolate, narrowed to a slender claw; fruiting pedicels divergent; pods cylindric, 3–4 cm. long, long-beaked; seeds several to many, imbedded in spongy tissue, the pods constricted between the seeds and becoming somewhat moniliform, finally breaking at the constrictions and falling away with the enclosed seed. Recently adventive in eastern Washington (Yakima, Spokane) and Idaho (Lewiston). Native of Asia.

52. *CONRÍNGIA* [Heist.] Adans. Fam. Pl. 2: 418. 1763.

Erect glabrous annual herbs, with sessile clasping leaves or the lower narrowed at base. Flowers in terminal elongated racemes. Sepals and petals narrow. Pod elongate-linear, 4-angled; valves 1–3-nerved, dehiscent. Style short; stigma entire or 2-lobed. Seeds in one row in each cell, oblong, marginless; cotyledons incumbent. [Name in honor of Herbert Conring, 1606–1681, professor at Helmstädt.]

A genus of about 7 species, natives of Europe and Asia. Type species, *Brassica orientalis* L.

1. *Conringia orientalis* (L.) Dumort. Treacle Mustard, Hare's-ear. Fig. 2152.

Brassica orientalis L. Sp. Pl. 666. 1753.

Erysimum perfoliatum Crantz, Stirp. Aust. 1: 27. 1762.

Erysimum orientale R. Br. Hort. Kew. ed. 2. 4: 117. 1812.

Conringia perfoliata Link, Enum. Hort. Ber. 2: 172. 1822.

Conringia orientalis Dumort. Fl. Belg. 123. 1827.

Stem erect, usually simple, 3–6 dm. high. Leaves oval to elliptical, deeply cordate-clasping, 4–10 cm. long; petals yellowish white, oblanceolate, 8 mm. long; pod ascending, 8–10 cm. long, about 2 mm. thick, 4-angled, spreading; beak about 1.5 mm. long.

In waste places, naturalized from Europe; British Columbia to California, Colorado, Missouri, Delaware, and New Brunswick. May–Aug.

Family 53. **CAPPARIDACEAE.****CAPER FAMILY.**

Herbs, shrubs or trees with pungent or acrid watery juice, simple or palmately compound alternate leaves and axillary or terminal, solitary or racemose, mostly regular and perfect flowers. Sepals 4–8, distinct or united below. Petals 4 or rarely none, sessile or clawed. Stamens 6 to many, inserted on the receptacle; anthers oblong, longitudinally dehiscent. Ovary sessile or stipitate, 1–2-celled; ovules many, borne on parietal placentae. Fruit a capsule or berry. Seeds generally reniform; endosperm none; cotyledons usually coiled.

A family of about 40 genera and 450 species, mostly of warm-temperate and tropical regions.

Stamens 4–6; stipe elongated in fruit.

Fruit several- to many-seeded.

Herbs; sepals distinct or nearly so.

Pod oblong or linear; petals generally clawed.

Pod rhomboid, broader than long; petals sessile.

Shrubs; calyx 4-cleft, persistent.

Fruit didymous, 2-celled, the cells separating as 1-seeded nutlets.

Styles filiform; nutlets open at the scar; racemes elongated, terminal.

Styles subulate, spinescent; nutlets closed at the scar; racemes short, axillary.

Stamens more than 6; stipe none or very short.

1. *Cleome*.

2. *Cleomella*.

3. *Isomeris*.

4. *Wislizenia*.

5. *Oxystylis*.

6. *Polanisia*.

1. CLEOME L. Sp. Pl. 671. 1753.

Herbs or some tropical species shrubs or rarely trees. Leaves simple or usually digitately 3–5-foliolate. Sepals 4, distinct or united at base, often persistent. Petals cruciate, entire, more or less clawed. Stamens 6, rarely 4. Ovary stipitate, with a gland at the base. Capsule pod-like, linear or oblong, long-stipitate, many-seeded. [Name of uncertain derivation, early applied to some mustard-like plant.]

About 75 species, mainly of tropical America and Africa. Type species, *Cleome gynandra* L.

Pods elongate-linear, glabrous.

Stamens much exceeding the petals, calyx deeply 4-parted.

Flowers pink or white, leaves 3-foliolate.

Flowers yellow, at least the lower, 5–7-foliolate.

Stamens equaling or shorter than the petals, sepals distinct.

Pods oblong, pubescent.

1. *C. serrulata*.

2. *C. lutea*.

3. *C. sparsifolia*.

4. *C. platycarpa*.

1. Cleome serrulata Pursh. Pink Cleome. Fig. 2153.

Cleome serrulata Pursh, Fl. Amer. Sept. 441. 1814.

Peritoma serrulatum DC. Prod. 1: 237. 1824.

Cleome integrifolia Torr. & Gray, Fl. N. Amer. 1: 122. 1838.

Annual with erect glabrous stems, 5–10 dm. high, branching above. Leaves glabrous, 3-foliolate, the lower on elongated petioles, the upper nearly or quite sessile; leaflets lanceolate or oblong, entire or serrulate, 25–75 mm. long; racemes elongated in fruit; pedicels slender, spreading or recurved; petals pink or white, oblong, slightly clawed, 10–12 mm. long; pods linear, 25–50 mm. long, acute; stipe about equaling the pedicel.

Plains and prairies, Sonoran Zones; eastern Washington to northeastern California, Saskatchewan, Kansas, New Mexico, and Arizona. Adventive in the Mojave Desert, southern California. Type locality: "on the banks of the Missouri River." June–Sept.

2. Cleome lutea Hook. Yellow Cleome. Fig. 2154.

Cleome lutea Hook. Fl. Bor. Amer. 1: 70. pl. 25. 1830.

Annual with erect branching stems, 5–15 dm. high. Leaves glabrous, 5–7-foliolate, slender-petioled, or the upper 3-foliolate and nearly sessile; leaflets oblong or oblong-lanceolate, entire, sessile or nearly so, 15–45 mm. long; racemes elongating in fruit; pedicels slender, 10–12 mm. long; petals yellow, obovate or oblanceolate, 6–8 mm. long; pod linear, 3–7 cm. long; fruiting stipe longer than the pedicel.

Loam or sandy bottom lands, Upper Sonoran Zone; eastern Washington to Inyo County, California, east of the Sierra Nevada, and eastward to Nebraska, Arizona, and New Mexico. Type locality: on the banks of the Columbia and in the valleys of the Blue Mountains, Oregon. June–Sept.

3. Cleome sparsifolia S. Wats. Few-leaved Cleome. Fig. 2155.

Cleome sparsifolia S. Wats. Bot. King Expl. 32. 1871.

Much branched glabrous annual, 1–3.5 dm. high. Leaves few, leaflets 1–3, petiolulate, 6–10 mm. long; racemes few-flowered; flowers yellow, petals narrowly spatulate, 11–13 mm. long; sepals 4, 1–2 mm. long; filaments equal, as long as or a little shorter than the petals; pod linear, 18–22 mm. long; stipe short, 4–6 mm. long, a little shorter than the pedicel.

Sandy desert flats, Upper and Lower Sonoran Zones; western Nevada to Inyo County, California. Type locality: Carson Desert near Ragtown, Nevada. May–Sept.

4. *Cleome platycarpa* Torr. Broad-podded Cleome. Fig. 2156.

Cleome platycarpa Torr. Bot. Wilkes Exp. 235. pl. 2. 1873.

Cleome platycarpa Greene, Pittonia 4: 211. 1900.

Annual, erect, pubescent and somewhat glandular, 3–7 dm. high. Leaves 3-foliolate, long-petioled; leaflets oval or oblong, entire, petiolulate, 1–3 cm. long; fruiting racemes elongated; pedicels 10–15 mm. long, distinct, linear-subulate; petals yellow, 6–7 mm. long, spatulate; pod elliptic, 12–15 mm. long, 6–7 mm. wide, flat with the seeds in two rows; fruiting stipes longer than the pedicels.

Alkaline and lava soils, Upper Sonoran Zone; Blue Mountains, eastern Oregon, to northeastern California, Idaho, and Nevada. Type locality: Klamath River, near Montague, California. May–Aug.

2. *CLEOMÉLLA* DC. Prod. 1: 237. 1824.

Erect branching or sometimes diffuse annuals. Leaves alternate, digitately 3-foliolate, petioled. Flowers nearly regular, small, yellow, in terminal bracted racemes or axillary. Sepals 4, distinct, deciduous. Petals 4, entire, sessile. Stamens 6. Capsule rhomboidal, broader than long, the valves often inflated and helmet-like. Seed usually two on each placenta. [Name diminutive of *Cleome*.]

About 14 species, natives of the arid western United States and northern Mexico. Type species, *Cleomella mexicana* DC.

Stipes much longer than the capsule.

Plants erect, branching, glabrous; sepals not ciliate.

Leaflets obovate to oblong; valves inflated, helmet-like.

Leaflets linear-oblong; valves not inflated.

Plants decumbent, pubescent; calyx ciliate.

Stipes shorter than the capsule.

Pedicels 15 mm. long, very slender.

Pedicels 2–3 mm. long, strongly recurved.

1. *C. Hillmanii*.

2. *C. plocasperma*.

3. *C. obtusifolia*.

4. *C. parviflora*.

5. *C. brevipes*.

1. *Cleomella Hillmanii* A. Nels. Hillman's Cleomella. Fig. 2157.

Cleomella Hillmanii A. Nels. Proc. Biol. Soc. Wash. 18: 171. 1905.

Cleomella longipes var. *grandiflora* S. Wats. Bot. King Expl. 33. 1879.

Plants bright green and glabrous throughout, the stems erect, simple or with a few branches below, stout and somewhat fistulous, 10–30 cm. high, usually floriferous for half the length. Leaves 3-foliolate, long-petioled; leaflets oblong-ovate, obtuse or truncate, mucronate, 1–2 cm. long, glabrous; racemes leafy-bracted, the bracts unifoliolate or the lower trifoliolate; pedicels slender, 12–15 mm. long; petals 6–7 mm. long; fruiting stipe exceeding the pedicel; capsule rhomboidal, 6–8 mm. broad; seeds smooth, stramineous.

Dry hillsides, Upper Sonoran Zone; western Nevada and probably adjacent California. Type locality: Reno, Nevada. April–June.

2. *Cleomella plocasperma* S. Wats. Alkali Cleomella. Fig. 2158.

Cleomella plocasperma S. Wats. Bot. King Expl. 33. 1871.

Cleomella oocarpa A. Gray, Proc. Amer. Acad. 11: 72. 1876.

Cleomella mojavenensis Payson, Univ. Wyoming Pub. Sci. 1: 36. 1922.

Cleomella stenasperma Coville ex Tidestrom, Proc. Biol. Soc. Wash. 36: 182. 1923.

Plants erect, branching, glabrous throughout. Leaflets oblong-linear, 15–25 mm. long, mostly exceeding the petioles; pedicels 6–8 mm. long; petals pale yellow, 5 mm. long; capsule irregularly rhombic-ovoid, 4–5 mm. long, the lateral angles often evident; stipe filiform, 10–12 mm. long; seeds stramineous throughout or lightly mottled with dark and light patches (both types often occurring on the same plant), smooth or microscopically marked.

Alkaline soils, Sonoran Zones; eastern Oregon, northern Nevada, south to the Colorado and Mojave Deserts, California. Type locality: Humboldt County, Nevada. May–Aug.

Variations in habit are quite marked. A tall strict form from the Mojave Desert and Owens Valley, California, has been described as variety *stricta* Crum, and a diffusely branched form also from the Mojave Desert as variety *mojavenensis* (Payson) Crum.

3. *Cleomella obtusifolia* Torr. Bushy Cleomella. Fig. 2159.

Cleomella obtusifolia Torr. & Frem. in Frem. Second Rep. 311. 1845.

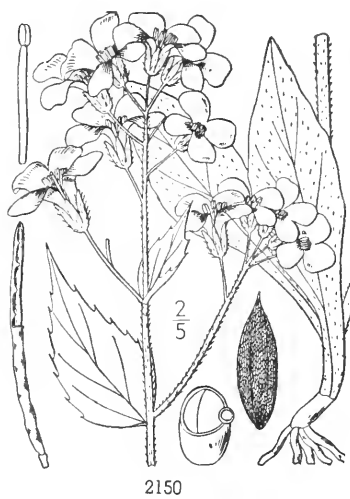
Cleomella taurocranos A. Nels. Proc. Biol. Soc. Wash. 18: 172. 1905.

Cleomella obtusifolia var. *pubescens* A. Nels. Proc. Biol. Soc. Wash. 18: 172. 1905.

Freely branching from near the base, forming a bushy plant 2–3 dm. high. Leaves 3-foliolate, oval or oblong, 5–15 mm. long, equaling the petioles, pale green and more or less pubescent; stipules fimbriate, often conspicuously white-ciliate; flowers in leafy racemes, the lower scattered nearly to the base of the stems; petals 4–5 mm. long; style 2 mm. long; capsule 8–10 mm. broad, the valves produced laterally into more or less well-developed horn-like processes; fruiting pedicels about 8 mm. long, a little longer than the slender recurved stipe.

Alkaline or sub-alkaline soils, Lower Sonoran Zone; Sacramento–San Joaquin Valley, Inyo County, California, and adjacent Nevada to the Colorado Desert, southern California. Type locality: "on the American Fork of the Sacramento River." March–Sept.

Some varieties have been described (Jepson, Fl. Calif. 2: 13. 1936) to indicate the variations in habit of growth.



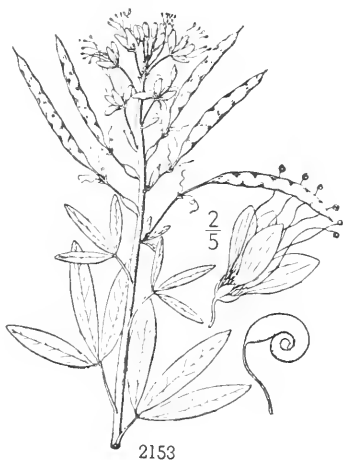
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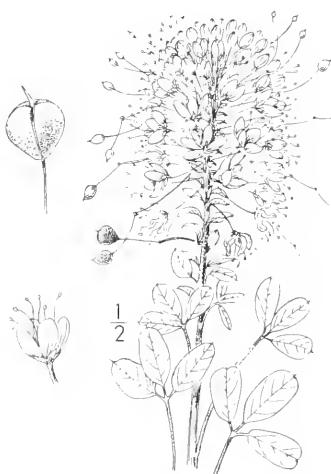
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2150. *Hesperis matronalis*
 2151. *Matthiola incana*
 2152. *Conringia orientalis*

2153. *Cleome serrulata*
 2154. *Cleome lutea*
 2155. *Cleome sparsifolia*

2156. *Cleome platycarpa*
 2157. *Cleomella Hillmanii*
 2158. *Cleomella plocasperma*



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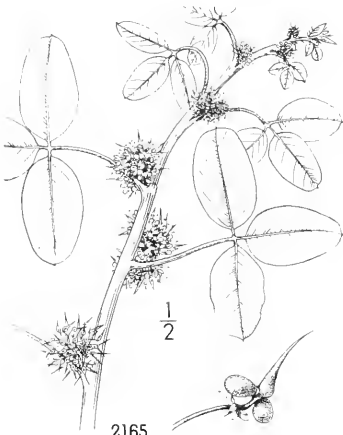
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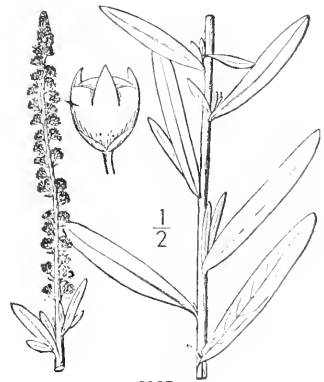
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2159. *Cleomella obtusifolia*
 2160. *Cleomella parviflora*
 2161. *Cleomella brevipes*

2162. *Isomeris arborea*
 2163. *Wislizenia californica*
 2164. *Wislizenia Palmeri*

2165. *Oxystylis lutea*
 2166. *Polanisia trachysperma*
 2167. *Reseda luteola*

4. *Cleomella parviflora* A. Gray. Small-flowered *Cleomella*. Fig. 2160.

Cleomella parviflora A. Gray, Proc. Amer. Acad. 6: 520. 1865.

Cleomella alata Eastw. Zoe 5: 87. 1900.

Stems usually branching from the base, the branches ascending, 10–40 cm. high. Leaves very short-petioled, trifoliolate; leaflets linear, 15–20 mm. long, glabrous; pedicels very slender, 15 mm. long in fruit; petals 1.5 mm. long, pale yellow, equaling the stamens; stigma almost sessile; capsule 3–4 mm. broad, inconspicuously horned; stipe scarcely 1 mm. long.

Alkaline soil, Lower Sonoran Zone; western Nevada and adjacent California, south to the Mojave Desert. Type locality: near Carson City, Nevada. May–Aug.

5. *Cleomella brevipes* S. Wats. Short-pedicelled *Cleomella*. Fig. 2161.

Cleomella brevipes S. Wats. Proc. Amer. Acad. 17: 365. 1882.

Stems branching from the base and spreading, glabrous, floriferous and leafy throughout. Leaves sessile or nearly so; leaflets narrowly oblanceolate, 5–15 mm. long, setosely apiculate; flowers solitary in all the axils, on curved pedicels about 3 mm. long; petals 1.5 mm. long; capsule ovoid, 3 mm. long, scarcely stipitate.

Alkaline soils, Lower Sonoran Zone; Inyo County, California, south through the Mojave Desert. Type locality: "Camp Cady, Mojave Desert." May–June.

3. *ISÓMERIS* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 124. 1838.

Ill-scented shrubs with puberulent branches, 3-foliolate petioled leaves and large yellow flowers, axillary or in bracteate racemes. Calyx-lobes 4, persistent. Petals 4, equal. Receptacle dilated with a hemispherical torus. Stamens 6, inserted on the receptacle. Ovary long-stipitate, many-ovuled; style short; stigma minute. Capsule inflated, tardily 2-valved. Seeds smooth. [Greek, meaning parts similar, in reference to the regular flowers.]

A monotypic genus of southwestern United States and adjacent Mexico.

1. *Isomeris arborea* Nutt. Bladderpod. Fig. 2162.

Isomeris arborea Nutt. in Torr. & Gray, Fl. N. Amer. 1: 124. 1838.

Cleome Isomeris Greene, Pittonia 1: 200. 1888.

Isomeris arborea var. *insularis* Jepson, Fl. Calif. 2: 11. 1936.

Widely branching glaucous shrub, 1–3 m. high, with hard yellow wood and puberulent branches. Leaves 3-foliolate; leaflets oblong to lanceolate, equaling the petioles, entire, mucronate; flowers in terminal bracteate racemes; bracts simple; calyx-lobes acute or acuminate; petals yellow, oblong, 10–16 mm. long; capsule strongly inflated, 25–35 mm. long, attenuate into the stipe and abruptly tapering at the apex.

Dry washes and slopes, Upper and Lower Sonoran Zones; Monterey County, California, south to Lower California, Arizona, and Sonora. Type locality: San Diego, California. Jan.–Nov.

Isomeris arborea var. *globosa* Coville, Proc. Biol. Soc. Wash. 7: 73. 1892. Capsule globose, not attenuate at base, otherwise as the typical form. This is the more common form in the Mojave Desert.

Isomeris arborea var. *angustata* Parish, Muhlenbergia 3: 128. 1907. Capsule scarcely inflated, attenuate at both ends. Frequent in the Colorado Desert, southern California, less so in the Mojave Desert and the coastal region.

4. *WISLIZÈNIA* Engelm. in Wisliz. Mem. Tour North. Mexico 99. 1848.

Erect, branching, ill-scented annuals. Leaves 1–3-foliolate, petioled, with small bristle-like stipules. Flowers yellow, in terminal racemes. Stamens well exerted. Pod didymous, each valve closely contracted upon its solitary seed and deciduous with it, nut-like, nerved or reticulated and sometimes tuberculate, open at the scar; stipe elongated and strongly refracted in fruit; style elongated, bristle-like. [Name in honor of Dr. A. Wislizenus, an early botanical explorer of California and the Southwest.]

Three or four species, natives of the arid southwestern United States and northern Mexico. Type species, *Wislizenia refracta* Engelm.

Tubercles at the summit of the nutlet low, rounded; leaves apparently all trifoliolate.

Tubercles elongated, encircling the summit and more or less connivent; leaves apparently all unifoliolate.

1. *W. californica*.

2. *W. Palmeri*.

1. *Wislizenia californica* Greene. California Stink-weed, Jackass Clover.

Fig. 2163.

Wislizenia californica Greene, Proc. Biol. Soc. Wash. 19: 130. 1906.

Stout, erect, much branched annual, 5–15 dm. high, sparingly leafy. Leaves 3-foliolate; leaflets oval, obtuse or sometimes acute, mucronulate, scaberulous on the midvein; racemes densely flowered, elongated in age; petals 3 mm. long; nutlets obovoid or somewhat pyriform, 2 mm. long, with a few low longitudinal ridges, the summit obscurely reticulate and beset with 4 or 5 low broad tubercles.

A bee plant, growing in low, usually sandy or alkaline ground, Sonoran Zones; Sacramento–San Joaquin Valley, California. Formerly referred to *Wislizenia refracta* Engelm. of Texas and New Mexico. April–Nov.

Wislizenia divaricàta Greene, loc. cit. A closely related plant of doubtful rank, distinguished by its more divaricate branches, and 1-foliolate leaves on the branches. Originally collected at Borego Springs, on the western border of the Colorado Desert, southern California.

2. *Wislizenia Pálmeri* A. Gray. Palmer's Stink-weed. Fig. 2164.

Wislizenia Palmeri A. Gray, Proc. Amer. Acad. 8: 622. 1873.

Erect widely branching glabrous annual. Leaves, at least those of the branches, 1-foliolate; leaflets linear-lanceolate, 3-5 cm. long; nutlets 3-4 mm. long with prominent longitudinal ridges, at the summit encircled by a row of prominent elongated tubercles.

Sandy soil, Lower Sonoran Zone; lower Colorado River, California and Arizona, extending to the Gulf of California. Type locality: "Lower Colorado River." April-July.

5. *OXÝSTYLIS* Torr. & Frem. in Frem. Second Rep. 312. 1845.

A smooth branching annual with 3-foliolate leaves, and dense head-like axillary racemes. Sepals linear-lanceolate. Petals yellow; stamens exserted. Ovary didymous, each valve closely constricted over its solitary ovule and closed at the scar; style subulate becoming spinescent. Fruit composed of 2 1-seeded nutlets, raised on a very short stout stipe. [Greek, referring to the spinescent style.]

A monotypic genus of the arid Southwest.

1. *Oxystylis lùtea* Torr. & Frem. Spiny Caper. Fig. 2165.

Oxystylis lutea Torr. & Frem. in Frem. Second Rep. 313. 1845.

Stems stout, simple or more or less branched, 3-5 dm. high. Petioles 3-4 cm. long; leaflets 15-25 mm. long, oblong-obovate, obtuse; racemes axillary, dense and head-like, not elongating in fruit; petals 4 mm. long; fruiting pedicels recurved, 3-5 mm. long; stipe about 2 mm. long; nutlets ovoid-globose, faintly reticulate; style spinescent, 4-6 mm. long.

Dry washes, Lower Sonoran Zone; southwestern Nevada and Inyo County, California, south to the Colorado Desert, California. Type locality: "on the Margoza [Amargosa] river, at the foot of a sandy hill; only seen in one place, but abundant there." April-May.

6. *POLANÍSIA* Raf. Journ. Phys. 89: 98. 1819.

Viscid-pubescent branching annuals, with a strong disagreeable odor. Leaves palmately 3-5-foliolate or rarely simple. Flowers in simple terminal racemes, bracteate. Sepals 4, deciduous. Petals 4, slender or clawed. Stamens 8-32, unequal. Receptacle bearing a gland at the base of the ovary on the upper side. Pod sessile or subsessile, elongated, cylindric or compressed, 2-valved from the summit. Seeds many, rugose or reticulate. [Name Greek, meaning very unequal, in reference to the stamens.]

A genus of about 30 species, natives of temperate and tropical regions. Type species, *Polanisia graveolens* Raf.

1. *Polanisia trachyspérma* Torr. & Gray. Western Clammy-weed. Fig. 2166.

Polanisia trachysperma Torr. & Gray, Fl. N. Amer. 1: 659. 1840.

Jacksonia trachysperma Greene, Pittonia 2: 174. 1891.

Stems usually branched, 3-8 dm. high. Leaves 3-foliolate, with petioles 15-45 mm. long; leaflets oblanceolate to narrowly ovate, 15-25 mm. long; sepals lanceolate, tinged with purple; petals 8-12 mm. long, notched at the apex, tapering below to a slender claw, yellowish-white; stamens well exserted, the longest about twice the length of the petals, purple; pods cylindric, 3-5 cm. long, narrowed at the base to a very short stipe.

Sandy or gravelly soils, Upper Sonoran and Arid Transition Zones; British Columbia south through eastern Washington and Oregon to northeastern California, east to Minnesota, Oklahoma, Texas, and Arizona. Type locality: Texas. June-Oct.

Family 54. RESEDÀCEAE.

MIGNONETTE FAMILY.

Annual or perennial, herbaceous or rarely partially woody plants. Leaves alternate or fascicled, with gland-like stipules. Flowers racemose or spicate, bracteate, more or less dimorphic. Calyx 4-7-parted. Petals generally as many as calyx-segments, cleft or entire, hypogynous. Receptacle usually with a fleshy hypogynous 1-sided disk. Stamens 3 to many, inserted on the disk, usually of unequal length. Pistil of 3-6 carpels; styles and stigmas 3 or the former absent; ovules numerous. Fruit generally a capsule. Seeds reniform; endosperm none; cotyledons incumbent.

A family of 6 genera and about 65 species, mainly natives of the Mediterranean region.

Petals 4-7; disk present.

Petals 2; disk absent.

1. *Reseda*.

2. *Oligomeris*.

1. *RÉSEDA* [Tourn.] L. Sp. Pl. 448. 1753.

Annual or perennial herbs, with erect or decumbent stems, and entire, lobed or pinnatifid leaves. Flowers small, spicate or narrowly racemose. Petals 4–7, toothed or cleft. Stamens 8–20, inserted on one side of the flower. Capsule 3–6-lobed, horned, opening at the top during anthesis or before the seeds mature. [The ancient Latin name, in reference to the supposed sedative effect of some of the species.]

A genus of about 55 species, all natives of the Old World. Type species, *Reseda lutea* L.

Capsule globose; leaves entire, linear-oblong.

1. *R. Luteola*.

Capsule oblong; leaves lobed or divided.

2. *R. lutea*.

Flowers greenish yellow; all but the lowest petal cleft.

3. *R. alba*.

Flowers white; all the petals cleft.

1. *Reseda Lutèola* L. Dyer's Mignonette. Fig. 2167.

Reseda Luteola L. Sp. Pl. 448. 1753.

Plants glabrous, the stems erect, simple or sparingly branched, 3–8 dm. high. Leaves linear to lanceolate, sessile or the lowest narrowed to a short petiole, entire; flowers greenish-yellow, in narrow at length much elongated racemes; petals 4 or 5, very unequal, 2–4 mm. long, the lower one linear, entire, the upper ones lobed; capsule globose, 4–6 mm. in diameter, with 3–4 apical teeth and 6–8 lateral ridges.

Adventive from Europe, and sparingly established in the Pacific States. Cultivated for its yellow dye, and known as Dyer's-weed or Dyer's Rocket. May–Oct.

2. *Reseda lutea* L. Yellow Mignonette. Fig. 2168.

Reseda lutea L. Sp. Pl. 449. 1753.

Plants pubescent or nearly glabrous, the stems ascending or decumbent. Leaves 5–10 cm. long, broadly ovate-oblong in outline, deeply lobed or pinnatifid, the segments linear or oblong; racemes narrow, becoming elongated; pedicels 4–5 mm. long in fruit, ascending; petals 6 or sometimes 5, 3–4 mm. long, all but the lowest one irregularly cleft; capsule oblong, 7–8 mm. long, with 3 or 4 short terminal teeth.

Waste places, sparingly established in the Pacific States. Adventive from Europe. May–Sept.

3. *Reseda álba* L. White Mignonette. Fig. 2169.

Reseda alba L. Sp. Pl. 449. 1753.

Plants glabrous and somewhat glaucous, with erect stems, 3–6 dm. high. Leaves 4–8 cm. long, oblong in outline, pinnatifid, the segments linear-oblong; racemes narrow, densely flowered; petals 6 or sometimes 5, white, 4–5 mm. long, all 3-cleft at the summit; capsule ovoid-oblong, 10–12 mm. long, usually 4-toothed at the apex.

In waste places, sparingly established in the Pacific States, especially in seaports. Adventive from southern Europe. May–Sept.

Reseda odorata L. Syst. Nat. ed. 10. 1046. 1858–59. The common fragrant mignonette of the gardens has cuneate, entire or 3-lobed leaves, fragrant flowers and deeply cleft petals. It is occasionally found as an escape in the Pacific States.

2. *OLIGÓMERIS* Camb. in Jacquemont Voy. Ind. Bot. 23: pl. 25. 1841–44.

Low glaucous annual or perennial herbs, with linear entire leaves, and small greenish flowers in terminal spikes. Sepals 4. Petals 2, posterior, free or united at the base, entire or 2–3-lobed, persistent. Disk none. Stamens 3–10. Ovary 4-angled and 4-beaked. Capsule 4-sulcate, opening at the summit. Seeds numerous. [Name Greek, meaning small and parts, in reference to the minute flowers.]

A genus of about 5 species, natives of the southwestern United States and adjacent Mexico; also Africa and Asia. Type species, *Oligomeris glaucescens* Camb.

1. *Oligomeris linifolia* (Vahl) J. F. Macbride. *Oligomeris*. Fig. 2170.

Reseda subulata Delile, Fl. Aegypt. Ill. 15. 1813. Nomen nudum.

Reseda linifolia Vahl, in Hornem. Hort. Hafn. 501. 1815.

Ellimia ruderalis Nutt. in Torr. & Gray, Fl. N. Amer. 1: 125. 1838.

Oligomeris glaucescens Camb. in Jacquemont, Voy. Ind. Bot. 23: pl. 25. 1841–44.

Oligomeris subulata Webb, Fragm. Aethiop. 26. 1854.

Oligomeris linifolia J. F. Macbride, Contr. Gray Herb. 53: 13. 1918.

Glabrous and somewhat fleshy annual, the stems branching at the base, ascending, 10–25 cm. high. Leaves often fascicled, narrowly linear, 1–2 cm. long; spikes terminating the branches, bracteate, densely flowered; flowers about 1 mm. long; petals 3, oblong, obscurely lobed, white; stamens 3; capsule depressed-globose, 3 mm. in diameter, 4-cuspidate; seeds smooth.

Usually in saline soils, Sonoran Zones; coastal and desert regions, southern California, east to Nevada and western Texas, and south to Mexico. Type locality: Canary Islands. Jan.–Sept.

Family 55. **SARRACENIACEAE.**

PITCHER-PLANT FAMILY.

Insectivorous plants inhabiting swamps or bogs, with short rootstocks and a poorly developed root system. Leaves basal, tubular or pitcher-shaped. Flowers solitary, nodding, terminating bracted scapes. Sepals 4 or 5, hypogynous, imbricated, persistent. Petals 5 or sometimes none, when present imbricated and deciduous. Stamens many, hypogynous; anthers versatile. Pistil 1, 3-5-carpellate; style peltate, simple or lobed; ovary 3-5-celled; ovules numerous, on many parietal placentae. Fruit a 3-5-celled, loculicidal capsule. Seeds small, reticulated; embryo minute; endosperm fleshy.

A family of three genera and about 10 species, all natives of the New World. Besides the following, *Sarracenia* (8 species) inhabits eastern North America and *Heliamphora* (1 species) Venezuela.

1. **DARLINGTONIA** Torr. Smiths. Contr. 6⁴: 4. *pl.* 12. 1854.

Perennial herb with slender rootstocks, and large basal leaves hood-like. Sepals 5. Petals 5. Stamens 12-15, in one series; filaments subulate; anther with uneven pollen sacs, turned sideways by a twist of the filament so the smaller sac stands next the ovary. Style short, 5-lobed; ovary somewhat turbinate, truncate or concave at the apex, 5-celled. Fruit a 5-valved loculicidal capsule. Seeds numerous, broadly clavate, covered with soft slender protuberances. [Name in honor of William Darlington, an American botanist of the 19th century.]

A monotypic genus of the Pacific States. The name *Darlingtonia* is not tenable according to the international rules, but it has been retained in hopes that the Botanical Congress will conserve the name, but if not the name must needs be *Chrysamorphia* Greene.

1. **Darlingtonia californica** Torr. California Pitcher-plant. Fig. 2171.

Darlingtonia californica Torr. Smiths. Contr. 6⁴: 5. *pl.* 12. 1854.

Chrysamorphia californica Greene, Pittonia 2: 191. 1891.

Leaves large, often 3-5 dm. long, enlarged upward into a rounded hood-like apex, with a rounded orifice on one side partially concealed by two foliaceous appendages, yellowish green tinged with brownish purple, the hooded apex with conspicuous translucent spots, inner surface of hood densely clothed with stiff reflexed hairs, the upper part of tube glabrous within, the lower part usually containing liquid and clothed with long tangled hairs; scapes about equaling the longer leaves; sepals oblong, 3-5 cm. long, yellowish green and lined with dull purple; petals 2-3 cm. long, ovate-lanceolate, narrowed toward both ends, dark purple.

Mountain swamps and bogs, Boreal Zones; Coquille Point, Coos County, Oregon, south to the Siskiyou Mountains and in the Sierra Nevada to Nevada County, California. Type locality: headwaters of the Sacramento River, northern California, near Mount Shasta, growing in marshes. April-July.

Family 56. **DROSERACEAE.**

SUNDEW FAMILY.

Perennial or biennial glandular-pubescent herbs, exuding a viscid secretion and insectivorous. Leaves usually basal, circinnate in the bud. Flowers fugacious, perfect, usually racemose. Calyx 4-8-parted or the sepals distinct, persistent. Petals 4-8, sometimes slightly united at base, hypogynous, convolute, marcescent. Stamens 4-20, hypogynous or perigynous. Ovary free or its base adnate to the calyx, 1-5-celled; styles 1-5, simple; ovules numerous. Fruit a 1-5-celled capsule, loculicidally dehiscent. Seeds several to many; endosperm fleshy; embryo cylindrical, straight.

Four genera and about 90 species of wide distribution.

1. **DRÓSERA** L. Sp. Pl. 281. 1753.

Bog plants, with tufted basal leaves clothed with glandular sensitive hairs which secrete a clear glutinous fluid that entraps insects. Flowers in a one-sided raceme terminating the scape. Calyx deeply 4-8-parted. Petals 4-8, spatulate. Stamens 4-8. Styles 3-5, deeply parted so as to appear as twice the number. Capsule 3-valved or rarely 5-valved, many-seeded. [Name Greek, meaning dew, in allusion to the dew-like drops secreted by the glands.]

About 85 species, most abundant in Australia. Type species, *Drosera rotundifolia* L.

Leaves orbicular or broader than long, long-petioled.

Leaves linear or much longer than broad.

1. *D. rotundifolia*.

2. *D. longifolia*.

1. *Drosera rotundifolia* L. Round-leaved Sundew. Fig. 2172.

Drosera rotundifolia L. Sp. Pl. 281. 1753.

Leaves spreading on the ground, the blades orbicular or nearly so, 6–12 mm. broad, abruptly narrowed to a flat petiole, 2–5 cm. long, the upper surface clothed with slender glandular hairs; scape glabrous or once-forked, 1–25-flowered; pedicels 2–4 mm. long; flowers opening in sunshine, 4 mm. broad; petals white or reddish, oblong; seeds spindle-shaped, the testa loose.

Bogs, chiefly Boreal Zones; Alaska to Labrador, south to Florida and central California; also Europe and Asia. Type locality: in Europe. July–Aug.

2. *Drosera longifolia* L. Oblong-leaved Sundew. Fig. 2173.

Drosera longifolia L. Sp. Pl. 282. 1753.

Drosera anglica Huds. Fl. Angl. ed. 2. 135. 1778.

Leaves erect, blades elongate-spatulate, 3–4 mm. wide and 15–30 mm. long, narrowed to sparingly hairy petioles 25–75 mm. long; scapes glabrous; racemes several-flowered, rarely one-flowered; petals white; seeds oblong, obtuse at both ends, the testa loose.

Bogs, Boreal Zones; Arctic America to northern California, Idaho, Michigan, Ontario, and Newfoundland; also Europe and Asia. Type locality: in Europe. July–Aug.

Family 57. CRASSULACEAE.

STONECROP FAMILY.

Mostly fleshy or succulent herbs or somewhat shrubby plants, without stipules. Flowers usually cymose, rarely racemose or solitary, regular, symmetrical and usually perfect. Calyx free from the ovary, 4–5-parted or 4–5-lobed. Petals the same number as the calyx-segments, distinct or united below, usually persistent, sometimes wanting. Stamens the same number as the petals or twice as many. Carpels same number as calyx-segments, distinct or united below, usually with a scale at the base of each; styles subulate or filiform; ovules many, arranged in 2 rows on the ventral suture, rarely few or solitary. Fruit composed of 1-celled follicles, dehiscent along the ventral suture. Seeds minute; endosperm fleshy, embryo terete, with short cotyledons.

A family of about 20 genera, and 500 species of wide geographical distribution.

Stamens 3–5, as many as petals.

Flowers clustered; seeds 1 or 2 in each carpel.

Flowers solitary; seeds several in each carpel.

Stamens 10, twice as many as corolla-segments (5 in *Sedella pentandra*).

Carpels 1-seeded; seed erect; annuals.

Carpels many-seeded; perennials.

Petals united below.

Flowering stems lateral, arising from the axils of the lateral leaves of the basal rosette.

Plants with a stout often branched rootstock.

Corolla tubular, the corolla-lobes erect with only the tips slightly spreading.

Corolla with the segments widely spreading.

Plants with small corms.

Flowering stems terminal, arising from the apex of the basal rosette.

Petals distinct.

Flowers polygamous; leaves scattered, not forming rosettes; carpels erect.

Flowers perfect; leaves usually forming rosettes; carpels more or less spreading.

1. *Tillaea*.

2. *Tillaeastrum*.

3. *Sedella*.

4. *Dudleya*.

5. *Stylophyllum*.

6. *Hasseanthus*.

7. *Gormania*.

8. *Rhodiola*.

9. *Sedum*.

1. *TILLAEÀ* [Micheli] L. Sp. Pl. 128. 1753.

Minute glabrous, slightly fleshy annuals, with minute opposite entire leaves, and minute flowers clustered in the axils. Calyx 3–5-parted. Petals 3–5, distinct, or united at the base. Carpels 3–5, distinct, with short subulate styles. Fruiting carpels 1–2-seeded. [Name in honor of Michael Angelo Tili, Italian botanist.]

A genus of about 25 species, natives of western North America, South America, New Zealand, Africa, and Europe. Type species, *Tillaea mucosa* L.

1. *Tillaea erecta* Hook. & Arn. Tillaea, Sand Pigmy-weed. Fig. 2174.

Tillaea erecta Hook. & Arn. Bot. Beechey 24. 1830.

Tillaea minima Miers ex Hook. & Arn. Bot. Misc. 3: 338. 1833.

Tillaea leptopetala Benth. Pl. Hartw. 310. 1849.

Crassula minima Reiche, Fl. Chile 2: 369. 1898.

Diminutive simple or usually tufted annual, 2–8 cm. high, often reddish tinged, the branches erect or ascending. Leaves 1.5–3 mm. long, ovate to oblong, connate at base; pedicels very

short, or often very slender and exceeding the leaves; sepals usually 4, 1 mm. long, ovate; petals lanceolate, acuminate, scarcely equaling the sepals; seeds 1 or rarely 2.

Dry usually sandy or gravelly places, Sonoran Zones; southern Oregon to Lower California, also Chile. Type locality: Concepción, Chile. Feb.-May.

2. TILLAEÆSTRUM Britt. Bull. N.Y. Bot. Gard. 3: 1. 1903.

Diminutive aquatic or uliginous, glabrous annuals with opposite leaves and minute flowers solitary in the axils. Sepals usually 4, distinct. Petals as many as sepals, distinct or united at the base. Carpels commonly 4, distinct; styles short. Fruiting carpels few- to several-seeded. [Name Latin, in reference to the close resemblance of these plants to the genus *Tillaea*.]

A genus of about 20 species of wide geographic distribution. Type species, *Tillaeastrum aquaticum* (L.) Britt.

1. *Tillaeastrum aquaticum* (L.) Britt. Water Pigmy-weed. Fig. 2175.

Tillaea aquatica L. Sp. Pl. 128. 1753.

Buillardia aquatica DC. Prod. 3: 382. 1828.

Tillaea angustifolia Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 558. 1840.

Tillaea Drummondii Torr. & Gray, Fl. N. Amer. 1: 558. 1840.

Tillaea Bolanderi Greene, Fl. Fran. 183. 1891.

Crassula aquatica Schoenl. in Engler & Prantl, Nat. Pflanzenf. 32a: 37. 1891.

Tillaeastrum aquaticum Britt. Bull. N.Y. Bot. Gard. 3: 1. 1903.

Stems 1-8 cm. high, more or less branched, slender, erect or spreading. Leaves linear-oblong, 4-6 mm. long, connate at base; flowers solitary in the axils on pedicels shorter than or in fruit exceeding the leaves, 4-merous or rarely 3-merous; sepals about 1.5 mm. long; petals slightly exceeding the sepals, greenish; carpels longer than the sepals; seeds several.

Mud, Transition and Sonoran Zones; widely distributed in the Pacific States, but not common, ranging across the continent; also in Europe and Africa. May-July. River-leek.

3. SEDÉLLA Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 45. 1903.

Diminutive annuals with slender stems, usually few-branched above the base. Leaves small, ovoid-oblong, fleshy. Flowers small, yellow, cymose. Calyx with 5 small triangular teeth. Petals 5, united at the base, linear to ovate-lanceolate. Stamens 5 or 10. Carpels 5, oblong, erect or spreading; styles slender. Seeds solitary in the carpel, erect. [Name diminutive of *Sedum*.]

A Californian genus of three or four species. Type species, *Sedella pumila* (Benth.) Britt. & Rose.

Stamens 5; petals 2 mm. long, erect in both flower and fruit.

1. *S. pentandra*.

Stamens 10.

Petals 3-4 mm. long, spreading in flower, erect in fruit; follicles connivent.

2. *S. pumila*.

Petals 2 mm. long, spreading in both flower and fruit; follicles spreading.

3. *S. Congdonii*.

1. *Sedella pentandra* H. K. Sharsmith. Mount Hamilton Sedella. Fig. 2176.

Sedella pentandra H. K. Sharsmith, Madroño 3: 240. pl. 12. 1936.

Erect glabrous annual, 3-10 cm. high, the stem straight, simple up to the inflorescence or with a few virgate branches from lower nodes. Lowest leaves opposite, the others alternate, closely imbricate in young plants, early deciduous, fleshy, oblong-ovoid to elliptic-obovoid, 4-7 mm. long, sessile; cymes usually spicate with 2-5 virgate branches 2-3 cm. long; bracts leaf-like but small; flowers crowded, 3 mm. long; sepals deltoid, 0.5 mm. long; petals united at base; greenish yellow, with a median reddish line, lanceolate, 2 mm. long; follicles 1.5 mm. long, yellowish or bright red, densely papillate, erect.

Rocky exposures, Upper Sonoran Zone; Inner Coast Ranges from Lake County to San Benito County, California. Type locality: Arroyo del Puerto, Stanislaus County, California. April-May.

Sedella leiocarpa H. K. Sharsmith, Madroño 5: 192. 1940. This recently described species is distinguished from *S. pentandra* by the following characters: follicles glabrous, somewhat spreading; petals 3-3.5 mm. long. Known only from the type locality: "Dry, rocky soil in chaparral, 6.5 miles north of Lower Lake, Lake County, California."

2. *Sedella pumila* (Benth.) Britt. & Rose. Sierra Sedella. Fig. 2177.

Sedum pumilum Benth. Pl. Hartw. 310. 1849.

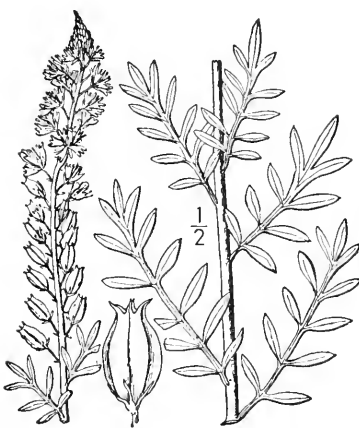
Sedella pumila Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 45. 1903.

Diminutive annuals, the stems slender, 2-12 cm. high, usually virgately branching. Leaves ovoid-oblong, fleshy, 2-5 mm. long, sessile, subcordate, alternate or the lowest opposite; flowers in few-forked cymes, sessile or short-pedicellate; calyx teeth triangular, minute; petals linear-lanceolate, 3-4 mm. long, greenish yellow; stamens 10; carpels narrowly oblong, smooth on the back and apex, conspicuously ciliate-papillate on the inner suture; styles slender, erect, 1 mm. long; follicles connivent but not closely appressed, with a fimbriate row of papillae on the suture.

Rocky places, especially igneous rocks, Upper Sonoran Zone; foothills of the Sierra Nevada from Sutter County to Merced County and the North Coast Ranges in Napa County, California. March-May.



2168



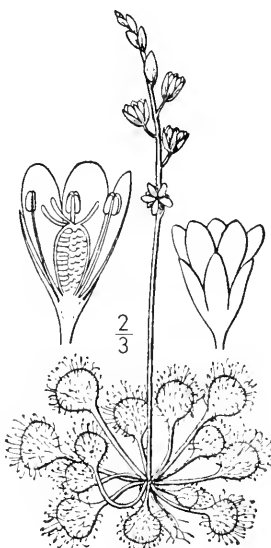
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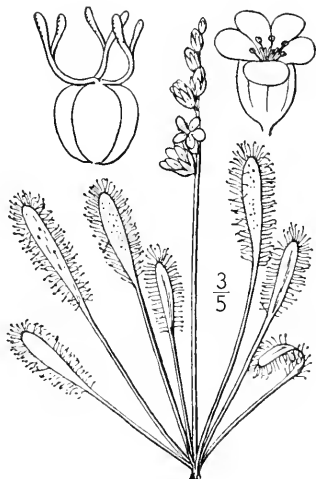
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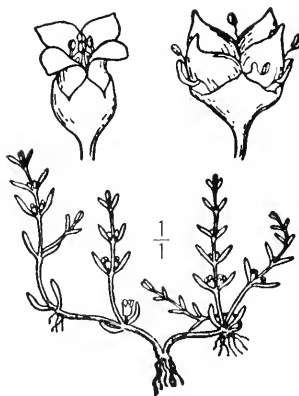
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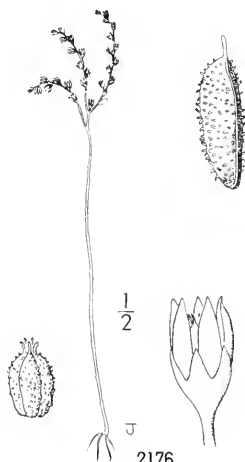
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2168. *Reseda lutea*
2169. *Reseda alba*
2170. *Oligomeris linifolia*

2171. *Darlingtonia californica*
2172. *Drosera rotundifolia*
2173. *Drosera longifolia*

2174. *Tillaea erecta*
2175. *Tillaea aquaticum*
2176. *Sedella pentandra*

3. *Sedella Congdonii* (Eastw.) Britt. & Rose. Congdon's *Sedella*. Fig. 2178.

Sedum Congdonii Eastw. Proc. Calif. Acad. III. 1: 135. pl. 11. 1898.

Sedella Congdonii Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 45. 1903.

Branched from the base with tortuose and diffuse branches, 3–10 cm. high and usually broader than high; herbage usually decidedly reddish. Leaves opposite or subopposite, obovoid or oblong-ovoid, 4–5 mm. long, branches of the cyme usually spreading and tortuose; petals bright yellow with a median reddish line, 2 mm. long, radiately spreading in both flower and fruit; styles recurved, 0.5 mm. long; follicles spreading.

Rocky banks, Upper Sonoran Zone; Sierra Nevada foothills from Eldorado County to Tulare County, California. April–May.

Congdonia pinetorum (Brandg.) Jepson, Man. Fl. Pl. Calif. 450. 1925. (*Sedum pinetorum* Brandg. Univ. Calif. Pub. Bot. 6: 358. 1916.) Diminutive fleshy herb with slender tuber-bearing rootstocks. Leaves imbricated in a compact basal rosette, sessile, ovate, 2–3 mm. long, relatively thin. Flowering stem simple, scapose, 2–4 cm. high, leafless or with 1 or 2 bract-like leaves above the middle. Flower solitary, terminal, erect. Calyx 5-parted. Petals ovate, 3–4 mm. long, white, spreading, united at base into a short tube.

This tiny plant was collected in July, 1913, by K. Brandegee "at deserted Pine City above Mammoth, Mono County, California," and has not been rediscovered. The type is in the Herbarium of the University of California, but is too fragmentary to furnish satisfactory material for illustration.

4. *DUDLEYA* Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 12. 1903.

Perennial herbs with a short stout, simple or branched caudex, bearing a rosette of fleshy leaves and one or more axillary flowering stems. Leaves of the flowering stems smaller, sessile or clasping, persistent. Inflorescence mostly a cymose panicle. Calyx deeply 5-lobed, the lobes erect. Corolla cream-yellow to red, nearly cylindric, the segments united below the middle, erect or the tips slightly spreading, convolute in the bud. Stamens 10, distinct, included. Carpels erect, many-seeded. [Name in honor of William Russel Dudley, American botanist.]

A genus of about 30 species, inhabiting western North America, and related to the Mexican genus *Echeveria*, from which it is distinguished by the convolute corolla-lobes, the persistent basal leaves, and the erect sepals. Type species, *Dudleya lanceolata* (Nutt.) Britt. & Rose.

Pedicels very slender, elongated and spreading; stem leaves suborbicular; petals united to near the middle.

Plants densely pulverulent.

Plants glabrous or nearly so.

Pedicels erect, rather slender or usually stout; stem leaves lanceolate or oblong-lanceolate to ovate, or oblong-obovate.

Interior species, or if coastal the corolla not pale yellow.

Corolla-lobes narrowly lanceolate, very acute or attenuate at apex; pedicels slender, mostly longer than the flowers.

Basal leaves mostly spreading and flaccid.

Corolla yellow.

Basal leaves lanceolate or oblong-lanceolate, acuminate or long-acuminate.

Basal leaves rhombic-ovate, abruptly acute or short-acuminate.

Corolla orange or red; leaves rhombic-ovate.

Leaves green or only slightly glaucous; corolla orange more or less tinged with red.

Leaves very glaucous; corolla red.

Basal leaves narrowly lanceolate, turgid and ascending.

Corolla light yellow.

Corolla reddish, the segments very narrow.

Corolla-lobes oblong, merely acute; pedicels mostly stout.

Leaves 4–10 cm. long; petals 10–14 mm. long, united only at base.

Corolla orange and more or less tinged with red.

Calyx-lobes lanceolate; pedicels mostly longer than the flowers.

Calyx-lobes ovate; pedicels mostly shorter than the flowers.

Corolla bright yellow or greenish yellow.

Leaves 2–3 cm. long; petals 7–10 mm. long, united about one-third their length.

Coastal species with pale yellow flowers.

Leaves bright green and shining, not at all glaucous, or the young central ones slightly so, ovate.

Leaves pale green and more or less densely glaucous or mealy.

Leaves densely white mealy.

Basal leaves ovate-lanceolate, broadest near the base, 6–7 cm. long; pedicels slender.

Basal leaves broadest above the middle, 6–8 cm. long, pedicels stout.

Leaves pale green and more or less glaucous, but not mealy.

Basal leaves lanceolate-acuminate; calyx-lobes ovate-lanceolate.

Basal leaves linear-lanceolate; calyx-lobes ovate-triangular.

1. *D. pulverulenta*.

2. *D. arizonica*.

3. *D. laxa*.

5. *D. nevadensis*.

4. *D. Goldmanii*.

6. *D. gigantea*.

7. *D. Setchellii*.

8. *D. angustiflora*.

9. *D. saxosa*.

10. *D. lanceolata*.

11. *D. grandiflora*.

12. *D. Abramsii*.

13. *D. caespitosa*.

14. *D. farinosa*.

15. *D. Greeneii*.

16. *D. candelabrum*.

17. *D. Cotyledon*.

1. *Dudleya pulverulenta* (Nutt.) Britt. & Rose. Chalk *Dudleya*. Fig. 2179.

Echeveria pulverulenta Nutt. in Torr. & Gray, Fl. N. Amer. 1: 560. 1840.

Echeveria argentea Lemaire, Ill. Hortie. 10: Misc. 78. 1863.

Cotyledon pulverulenta Brewer & Wats. Bot. Calif. 1: 211. 1876.

Dudleya pulverulenta Britt. & Rose, N. Amer. Fl. 22: 35. 1905.

Rootstock short and thick, whole plants densely mealy-pulverulent throughout. Basal leaves

many, spreading, 15 cm. long or less, obovate-spatulate, 5-9 cm. wide, acute; flowering stems stout, 5-8 dm. high; stem leaves ovate, acute or the lower acuminate, cordate-clasping; flowers in two or several elongated, ascending racemes; pedicels very slender, 1-2 cm. long, spreading; flowers erect or ascending, 15 mm. long; calyx-lobes 5 mm. long, lanceolate, acute; petals red, acute, united nearly to the middle; carpels nearly or quite distinct, erect.

Rocky cliffs and ridges, Upper Sonoran Zone; San Luis Obispo County, California, to northern Lower California. May-July.

2. *Dudleya arizonica* Rose. Arizona Dudleya. Fig. 2180.

Dudleya arizonica Rose, *Addisionia* 8: 35. pl. 274. 1923.

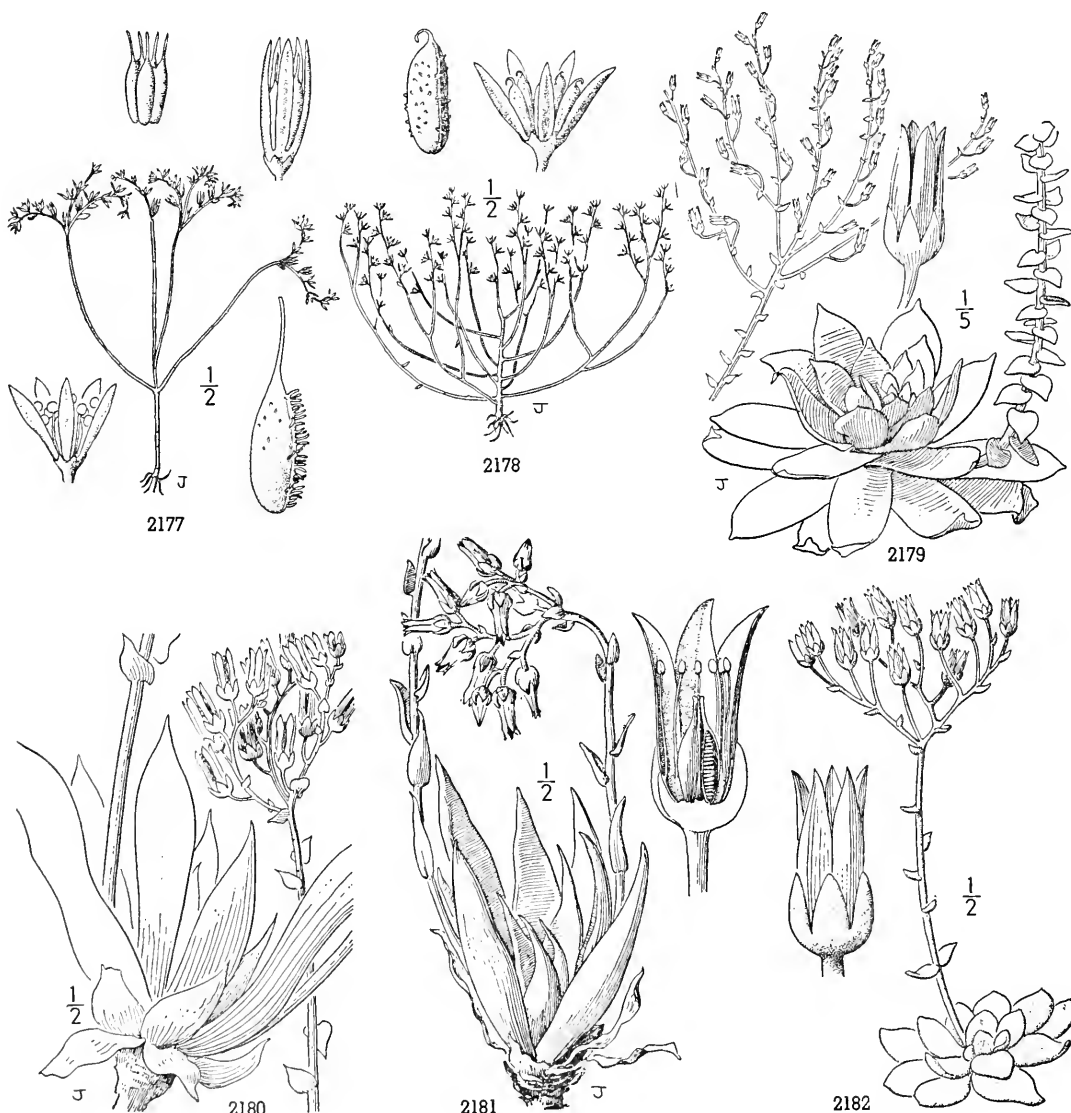
Echeveria lagunensis Munz, *Bull. S. Calif. Acad.* 31: 64. 1932.

Dudleya lagunensis E. Walther, *Leaflets West. Bot.* 1: 29. 1932.

Echeveria arizonica Kearney & Peebles, *Journ. Wash. Acad. Sci.* 29: 479. 1939. Not Hort. ex Berger. 1930.

Caudex simple or few-branched, short. Basal leaves rhombic-obovate, abruptly short-acuminate, 4-7 cm. long, flat and somewhat flaccid, pale green but not mealy; flowering stem stout, erect or somewhat declining, 3-4 dm. long, usually simple, leafy; stem leaves broadly ovate, acute, cordate-clasping at base, widely spreading; cyme usually with 2-3 branches; pedicels slender, at least the lower longer than the flowers; calyx-lobes lanceolate; corolla 12-15 mm. long, red, the lobes obtuse.

Rocky desert slopes, Upper Sonoran Zone; desert slopes of the Cuyamaca and Laguna Mountains, southern California, east to western Arizona. May-July.



2177. *Sedella pumila*

2178. *Sedella Congdonii*

2179. *Dudleya pulverulenta*

2180. *Dudleya arizonica*

2181. *Dudleya laxa*

2182. *Dudleya Goldmanii*

3. *Dudleya láxa* (Lindl.) Britt. & Rose. Lax or Spreading Dudleya. Fig. 2181.

Echeveria laxa Lindl. Jour. Hort. Soc. 4: 292. 1849.
Echeveria cymosa Lemaire, Rev. Hort. 1858: 439. 1858.
Cotyledon cymosa Baker in Saund. Ref. Bot. 1: pl. 68. 1869.
Cotyledon laxa Benth. & Hook. ex S. Wats. Bot. Calif. 1: 212. 1876.
Cotyledon Plattiana Jepson, Fl. W. Mid. Calif. 267. 1901.
Dudleya laxa Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 19. 1903.
Dudleya cymosa Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 21. 1903.

Caudex short with 1-3 rosettes. Basal leaves spreading, ovate to lanceolate, 4-7 cm. long, broadest at or near the base, fleshy, slightly rounded on the lower surface and concave on the upper, glaucous when young, the older becoming glabrous and rather bright green; flowering stem rather weak, 3-6 dm. long, purplish; stem leaves few, triangular-lanceolate, somewhat cordate; cyme loose, its branches slender, spreading, simple or forked; flowers secund; pedicels slender, 5-10 mm. long; calyx-lobes ovate-lanceolate, acute, 3-4 mm. long; corolla yellow, 10-15 mm. long, its lobes oblong-lanceolate, acute or acuminate.

Rocky or sandy soil, Upper Sonoran and Transition Zones; California North Coast Ranges to southern California. May-July.

4. *Dudleya Goldmani* Rose. Goldman's Dudleya. Fig. 2182.

Dudleya Goldmani Rose, Bull. N.Y. Bot. Gard. 3: 19. 1903.
Dudleya ovatifolia Britt. Bull. N.Y. Bot. Gard. 3: 20. 1903.
Echeveria Goldmani Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 478. 1930.

Caudex very short, with one to few rosettes. Basal leaves rhombic-ovate, 2-4 cm. long, abruptly short-acuminate, flat, glaucous; flowering stems slender, 1-2 dm. high; stem leaves ovate, cordate, spreading; cyme flat-topped; pedicels slender, 10-15 mm. long; calyx-lobes ovate, acutish; corolla 10-12 mm. long, yellow, usually tinged with rose, the lobes lanceolate, acute.

Rocky slopes, Upper Sonoran and Transition Zones; Coast Ranges from Monterey County to Los Angeles County, California. June-Aug.

5. *Dudleya nevadensis* (S. Wats.) Britt. & Rose. Sierra Dudleya. Fig. 2183.

Cotyledon nevadensis S. Wats. Bot. Calif. 1: 212. 1876.
Dudleya nevadensis Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 20. 1903.
Echeveria nevadensis Nels. & Macbr. Bot. Gaz. 56: 477. 1913.

Caudex very short, with 1-3 rosettes. Basal leaves obovate to oblanceolate, 6-10 cm. long, 3-5 mm. wide, green or the younger leaves somewhat glaucous; flowering stems slender, 1-3 dm. high, usually pale; stem leaves lanceolate to oblanceolate, slightly clasping or sessile; inflorescence a rather dense compound cyme; pedicel 6-12 mm. long; calyx-lobes triangular-lanceolate, acute, 3-4 mm. long, glaucous; corolla yellow tinged with red, cleft to below the middle, the lobes narrowly oblong-lanceolate, acuminate.

Upper Sonoran and Transition Zones; Sierra Nevada, from Butte County to Kern County, California. May-Aug.

Dudleya nevadensis subsp. *minor* (Rose) Abrams. (*D. minor* Rose, Bull. N.Y. Bot. Gard. 3: 19. 1903.) Caudex very short, with one to few rosettes. Basal leaves spreading, glaucous, flat, rhombic-ovate, abruptly acuminate, the larger 5-7 cm. long; cyme with a few elongated ascending secund racemes; pedicels slender, 10-15 mm. long; calyx-lobes ovate to ovate-lanceolate; corolla 12 mm. long, pale yellow tinged with rose in age, the lobes lanceolate, acute. Rocky slopes and cliffs, Upper Sonoran and Transition Zones; San Gabriel Mountains, southern California. Some forms of this subspecies have the stem leaves somewhat spreading and cordate, thus approaching *D. Goldmani*.

6. *Dudleya gigantea* Rose. Amador Dudleya. Fig. 2184.

Dudleya gigantea Rose, Bull. N.Y. Bot. Gard. 3: 23. 1903.
Cotyledon gigantea Fedde in Just, Bot. Jahresb. 31¹: 826. 1904.
Echeveria amadorana Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 479. 1930.

Rootstock short and thick. Basal leaves in a dense rosette, very glaucous, oblanceolate, 5-7 cm. long; flowering stems stout, about 3 dm. high; inflorescence paniculate with usually numerous erect branches; pedicels 5-10 mm. long; calyx-lobes broadly ovate, obtuse or acutish; corolla 9-10 mm. long, red at least in age, the lobes united at base into a short tube, acute at apex.

Rocky banks, Upper Sonoran Zone; western slopes of the central Sierra Nevada, California. June-July.

7. *Dudleya Setchellii* (Jepson) Britt. & Rose. Setchell's Dudleya. Fig. 2185.

Cotyledon laxa var. *Setchellii* Jepson, Fl. W. Mid. Calif. 267. 1901.
Dudleya Setchellii Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 15. 1903.
Echeveria Setchellii Nels. & Macbr. Bot. Gaz. 56: 477. 1913.

Caudex short and thick at length bearing several rosettes. Basal leaves narrowly lanceolate or linear, long-acuminate, thick and concave on the upper surface, pale green and glaucous; flowering stems several, 1-3 dm. high, rather slender, their leaves linear-lanceolate, acuminate; inflorescence a narrow panicle; pedicels rather stout, 4-5 mm. long; calyx-lobes lanceolate, acute; corolla-lobes pale yellow, narrowly oblong-lanceolate, acute; stamens much shorter than the corolla.

Rocky ledges and banks, Upper Sonoran Zone; Inner Coast Ranges, from Alameda County to San Benito County, California. May-June.

8. *Dudleya angustiflora* Rose. Tulare Dudleya. Fig. 2186.

Dudleya angustiflora Rose, Bull. N.Y. Bot. Gard. 3: 14. 1903.

Echeveria angustiflora Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 477. 1930.

Caudex very short, mostly simple. Basal leaves lanceolate, 3–4 cm. long, rather rigidly ascending, pale green and somewhat glaucous; flowering stem slender, 6–20 cm. high; cyme with a few spreading branches; pedicels slender, about equaling the flowers; corolla narrow, 10–12 mm. long, tinged with red, the segments attenuate.

Rock outcrops, Arid Transition Zone; southern Sierra Nevada to the San Bernardino Mountains, California. May–July.

9. *Dudleya saxosa* (M. E. Jones) Britt. & Rose. Panamint Dudleya. Fig. 2187.

Cotyledon saxosa M. E. Jones, Contr. West. Bot. No. 8: 28. 1898.

Dudleya saxosa Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 15. 1903.

Echeveria saxosa Nels. & Macbr. Bot. Gaz. 56: 476. 1913.

Rootstock stout, short. Basal leaves numerous, forming dense rosettes, ascending, the inner younger leaves glaucous, the outer pale green but not glaucous, narrowly lanceolate, 4–8 cm. long, about 15 mm. wide, semi-terete, rounded on the back and slightly concave on the inner face; flowering stem 15–25 cm. high; stem leaves ovate-lanceolate, slightly cordate at base, ascending; cyme many-flowered, rather open, 6–10 cm. broad; pedicels 10–15 mm. long, erect, slender but rather rigid; calyx-lobes lanceolate to ovate-lanceolate, about 4 mm. long; corolla yellow, turning reddish, especially along the midvein in age, 6–8 mm. long; petals oblong-oval, rather abruptly acute.

Rocky slopes, Sonoran Zones; Panamint and Providence Mountains, Mojave Desert, California. May–June.

10. *Dudleya lanceolata* (Nutt.) Britt. & Rose. Lance-leaved Dudleya. Fig. 2188.

Echeveria lanceolata Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 561. 1840.

Cotyledon lanceolata Benth. & Hook. ex S. Wats. Bot. Calif. 1: 211. 1876.

Dudleya lanceolata Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 24. 1903.

Caudex short, simple, bearing a rather loose rosette at the summit. Basal leaves pale green, the inner younger ones glaucous, the outer often glabrous, lanceolate, long-acuminate, 8–15 cm. long, 15–20 mm. wide, flat or slightly concave on the inner surface, slightly rounded on the back; flowering stems 4–6 dm. high, usually tinged with red; stem leaves lanceolate, acuminate with a broad cordate base; cyme 6–10 cm. broad; pedicels stout, 3–8 mm. long; calyx-lobes broadly ovate, 4 mm. long, acute or obtusish; corolla yellow, tinged with red, 12–16 mm. long, the segments oblong-lanceolate, acute or somewhat acuminate.

Dry sandy or gravelly soils, Sonoran Zones; cismontane region, from San Simeon, Monterey County, California, to northern Lower California. May–July.

Dudleya Brauntönii Rose, Bull. N.Y. Bot. Gard. 3: 24. 1903. Caudex branched, often bearing 6–8 rosettes. Basal leaves pale green and very glaucous, strap-shaped, 10–20 cm. long, 1–2 cm. broad, acute; flowering stem about 3–6 dm. high, pale green; stem leaves ovate, thick, clasping; inflorescence of 3–4 branches, at length elongated; pedicels stout, 1–3 mm. long; calyx-lobes 4–5 mm. long, broadly ovate; corolla pale greenish yellow, 12 mm. long, the segments oblong, acute. This is apparently restricted to the vicinity of Los Angeles in the Elysian Hills. It differs from *lanceolata* principally in the more glaucous leaves and pale flowers.

Dudleya delicata Rose, Bull. N.Y. Bot. Gard. 3: 24. 1903. This is another form related to *lanceolata*, with greenish yellow flowers and very glaucous leaves. It differs from *D. Brauntönii* in its more slender habit, and leaves which taper from the base. Known only from the original collection in Spencer Valley, San Diego County, California.

Dudleya lùrida Rose, Bull. N.Y. Bot. Gard. 3: 22. 1903. Basal leaves bright glossy green and shining at flowering time, becoming bronzed in age, lanceolate-acuminate, 10–15 cm. long, 1–2 cm. wide at the middle; flowering stems stout, 3–5 dm. high, tinged with purple; calyx-lobes ovate, acute, 5–6 mm. long, reddish; corolla reddish. Coast Ranges, Santa Barbara to Orange County, California. It differs from *D. lanceolata* in the bright glossy green leaves.

11. *Dudleya grandiflora* Rose. Large-flowered Dudleya. Fig. 2189.

Dudleya grandiflora Rose, Bull. N.Y. Bot. Gard. 3: 16. 1903.

Echeveria grandiflora Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 478. 1930.

Caudex short and very thick, crowned by a dense rosette. Basal leaves glaucous when young, pale green in age, strap-shaped, broadest at the base and gradually tapering to the apex, 10–15 cm. long, 1–2 cm. broad just above the base; flowering stem stout, 3–5 dm. high, bright red, especially above; stem leaves scattering, ovate-acuminate, obscurely cordate at base; cymes with the main branches ascending, 10–15 cm. wide; pedicels, at least the lower, 10–15 mm. long; calyx reddish, the lobes ovate, acute, 4–5 mm. long; corolla 10–12 mm. long, greenish yellow, tinged with red in age, the segments oblong-lanceolate, erect, with only the acute apex spreading.

Sandy or gravelly slopes, Sonoran Zones; desert slopes of the San Bernardino and San Jacinto Mountains, southern California. March–May.

12. *Dudleya Abrámsii* Rose. Abrams' Dudleya. Fig. 2190.

Dudleya Abramsii Rose, Bull. N.Y. Bot. Gard. 3: 14. 1903.

Echeveria Abramsii Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 477. 1930.

Basal leaves in a dense rosette crowning the short thick caudex, lanceolate, tapering from the base to the apex, acuminate, 2 cm. long, pale green and somewhat glaucous; flowering stems slender, 6–10 dm. high, naked below, bearing a few ovate acute bracts above; inflorescence 2–3-branched; flowers subsessile; calyx 3-mm. long, the lobes triangular-lanceolate; corolla yellow, with deep red stripes on the back, 7–10 mm. long.

Rock crevices, Upper Sonoran Zone; San Jacinto Mountains, southern California, to northern Lower California. May–July.

13. *Dudleya caespitosa* (Haw.) Britt. & Rose. Sea Lettuce. Fig. 2191.

Cotyledon caespitosa Haw. Misc. Nat. 180. 1803.

Cotyledon linguiformis R. Br. in Ait. Hort. Kew. ed. 3. 2: 109. 1811.

Cotyledon lingula S. Wats. Proc. Amer. Acad. 14: 293. 1879.

Dudleya caespitosa Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 27. 1903.

Caudex branched bearing a dense cluster of rosettes. Basal leaves bright green, shining or somewhat glaucous, ovate to oblong-lanceolate, very fleshy and rigid, 3–6 cm. long, 2 cm. wide, gradually narrowed from the base; flowering stem 2–3 dm. high, usually reddish; stem leaves very thick, clasping, ovate or the lower oblong-ovate; inflorescence a compact cyme; pedicels short, the longest 3–4 mm.; calyx-lobes triangular, acutish; corolla pale yellow, 8–10 mm. long, the lobes acutish or obtuse.

Bluffs along the coast, Upper Sonoran and Transition Zones; central California. *Dudleya congesta*, *D. compacta*, *D. Eastwoodiae* (Rose, Bull. N.Y. Bot. Gard. 3: 25–27. 1903) all seem to be merely minor variations of this common maritime species. June–July.

14. *Dudleya farinosa* (Lindl.) Britt. & Rose. Powdery Dudleya. Fig. 2192.

Echeveria farinosa Lindl. Journ. Hort. Soc. 4: 292. 1849.

Cotyledon farinosa Baker in Saund. Ref. Bot. 1: pl. 71. 1869.

Dudleya farinosa Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 15. 1903.

Caudex stout, short, bearing a single or usually several rosettes. Basal leaves closely tufted, densely white-mealy, lingulate, acute, flat on the upper surface, slightly rounded on the back, 12–15 mm. wide, 3–5 cm. long; flowering stems stout, usually reddish, leafy; stem leaves ovate-triangular, 1–2 cm. long, concave, deeply sagittate, the basal lobes often turned upward; cyme 5–7 cm. broad; pedicels rather slender, 4–6 mm. long; calyx-lobes broadly lanceolate; corolla cream-yellow, 10 mm. long, its lobes oblong, acute.

Bluffs along the seashore, Upper Sonoran and Humid Transition Zones; northern and central California.

Dudleya septentrionalis Rose, Bull. N.Y. Bot. Gard. 3: 26. 1903. Caudex branches bearing several crowded rosettes of leaves, these densely white-mealy, ovate, thick, 20–25 mm. broad; flowering stem stout; cyme compact; calyx-lobes ovate, acute; corolla pale greenish yellow, the lobes broad, obtuse. Rock crevices, along the coast, Del Norte County, California.

15. *Dudleya Greenei* Rose. Greene's Dudleya. Fig. 2193.

Dudleya Greenei Rose, Bull. N.Y. Bot. Gard. 3: 17. 1903.

Echeveria Greenei Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 478. 1930.

Cespitose, the caudex branched, stout, bearing several rosettes. Basal leaves oblong-oblancoate, usually broadest above the middle, 6–8 cm. long, 15–20 mm. wide, acute, densely pulverulent when young, becoming reddish tinged in age; flowering stems stout, 3–4 dm. high; stem leaves ovate-lanceolate, cordate at base, spreading; branches of the cyme secund; pedicels stout, 1–4 mm. long; calyx-lobes triangular-lanceolate, 4 mm. long; corolla light yellow, 10–12 mm. long, its tube 2 mm. long.

Rocks near the sea, Upper Sonoran Zone; Santa Cruz, Santa Rosa, and San Miguel Islands, southern California. May–Aug.

16. *Dudleya candelabrum* Rose. Candelabrum Dudleya. Fig. 2194.

Dudleya candelabrum Rose, Bull. N.Y. Bot. Gard. 3: 17. 1903.

Echeveria candelabrum Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 476. 1930.

Basal leaves forming a dense broad rosette, somewhat glaucous, oblong-lanceolate, broadest near the base, 10–15 cm. long, flowering stem 3–5 dm. high, stout; stem leaves ovate-lanceolate, acuminate; inflorescence a widely branched panicle, often 20–25 cm. broad; pedicels stout, 1–4 mm. long; calyx 5–7 mm. long, the lobes oblong-lanceolate, acute; corolla 5–9 mm. long, lemon-yellow.

Rock crevices, Upper Sonoran Zone; Santa Cruz Island, California. May–July.

17. *Dudleya Cotyledon* (Jacq.) Britt. & Rose. First Dudleya. Fig. 2195.

Sedum Cotyledon Jacq. f. Eclog. Pl. 1: 27. 1811.

Cotyledon californica Baker in Saund. Ref. Bot. 1: pl. 70. 1869.

Echeveria californica Baker, loc. cit. as syn.

Dudleya Cotyledon Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 28. 1903.

Dudleya Helleri Rose, Bull. N.Y. Bot. Gard. 3: 27. 1903.

Caudex very short, bearing one to few rosettes. Basal leaves many, linear-lingulate, pale green and slightly glaucous, 5–10 cm. long, 15–20 mm. wide, acuminate, widened at base; flowering stems stout, 4–5 dm. high, glaucous; stem leaves many, ovate, sagittate, clasping, the lower about 2 cm. long; inflorescence cymose-paniculate, up to 25 cm. long; pedicels stout, 4–10 mm. long; calyx-lobes triangular-ovate, white farinose; corolla yellow, 10 mm. long, the lobes oblong-lanceolate, acute.

Usually in sandy soil, Upper Sonoran and Transition Zones; near the coast, central California. May–July.

5. *STYLOPHÝLLUM* Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 33. 1903.

Perennials with a simple or branched rootstock, crowned by rosettes of succulent leaves. Basal leaves elongated, linear, terete or flattened. Flowering stems with long

narrow sessile leaves not clasping at base. Inflorescence paniculate or cymose. Calyx 5-lobed, the lobes ovate, short. Corolla campanulate, not angled, white, yellowish or red, the tube short, the lobes broad, thin and spreading. Stamens 10, borne on the corolla tube. Carpels 5, united below, generally spreading above. [Name Greek, in reference to the pencil-shaped leaves of the type species.]

A genus of about 10 species, restricted to the coastal region of California and Lower California. Type species, *Stylophyllum edule* (Nutt.) Britt. & Rose.

Leaves flattened, especially the lower half.

Leaves viscid.

Leaves not viscid.

Calyx-lobes obtuse at apex.

Calyx-lobes acute.

Leaves terete or nearly so, above the base.

Calyx-lobes acute.

Calyx-lobes rounded or obtuse.

Inflorescence in a congested cyme.

Inflorescence open.

1. *S. viscidum*.

2. *S. albidum*.

3. *S. insulare*.

4. *S. edule*.

5. *S. nudicaule*.

6. *S. Orcuttii*.

1. *Stylophyllum viscidum* (S. Wats.) Britt. & Rose. Sticky *Stylophyllum* or Pencil Leaf. Fig. 2196.

Cotyledon viscida S. Wats. Proc. Amer. Acad. 17: 372. 1882.

Stylophyllum viscidum Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 33. 1903.

Echeveria viscida Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 480. 1930.

Caudex stout, short, usually branched with several rosettes. Basal leaves narrowly lanceolate, acuminate, obtusely triquetrous, 6–9 cm. long, about 1 cm. wide, viscid; flowering stems 3–5 dm. high, stout; stem leaves similar to the basal but smaller; flowers in a compound cyme 5–8 cm. broad, and often with a few in the leaf axils below the cyme; pedicels 1–4 mm. long; calyx-lobes ovate-lanceolate, acute, 3–4 mm. long; corolla reddish, 8–10 mm. long; stamens and styles about equaling the corolla-lobes.

Rocky banks, Sonoran Zones; near the coast in Orange and San Diego Counties. California. June–July.

Stylophyllum virens Rose, Bull. N.Y. Bot. Gard. 3: 34. 1903. Caudex stout, branched, more or less elongated. Leaves of the rosettes spreading, shining, not glaucous, 5–9 cm. long, 10–15 mm. wide at the base, gradually tapering to the apex, flattened; flowering stem stout, 3–5 dm. high; calyx-lobes ovate, acute; corolla cream-colored tinged with red, the tube scarcely equaling the calyx-lobes. Rocky ledges, San Clemente Island, southern California.

2. *Stylophyllum albidum* Rose. White *Stylophyllum*. Fig. 2197.

Stylophyllum albidum Rose, Bull. N.Y. Bot. Gard. 3: 34. 1903.

Echeveria albida Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 480. 1930.

Caudex stout, simple or branched. Basal leaves in a dense rosette, ligulate, very glaucous, 4 cm. long, about 1 cm. wide at the base, very thick, the upper one-third nearly terete; flowering stems 3 dm. high, reddish, their leaves scattered, lanceolate, acuminate; inflorescence cymose-paniculate, somewhat flattened; calyx-lobes ovate, obtuse; corolla 7 mm. long, reddish, its lobes lanceolate, acute; carpels spreading above.

Rock ledges, San Clemente Island, southern California. June.

3. *Stylophyllum insulare* Rose. Catalina *Stylophyllum*. Fig. 2198.

Stylophyllum insulare Rose, Bull. N.Y. Bot. Gard. 3: 34. 1903.

Echeveria insularis Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 480. 1930.

Caudex stout and woody, often 6–8 cm. thick. Basal leaves spreading, 10–15 cm. long, 10–15 mm. broad remaining about the same width to above the middle, fleshy, flattened below, subterete toward the apex, glaucous, at least when young; flowering stems stout, 25–40 cm. high; inflorescence paniculate-cymose; calyx-lobes ovate, acute; corolla 7 mm. long, reddish, the lobes lanceolate, acute, spreading.

Rocky cliffs, Santa Catalina Island, southern California. May–June.

Stylophyllum Hássei Rose, Bull. N.Y. Bot. Gard. 3: 35. 1903. Closely resembles *S. insulare* in corolla and calyx characters, but plant more slender, and the branches of the inflorescence few and elongated. Rocks along the shore, Santa Catalina Island.

Stylophyllum Tráskiae Rose, Bull. N.Y. Bot. Gard. 3: 34. 1903. Caudex stout, clothed with the withered leaf bases. Basal leaves in close rosette, very glaucous, strap-shaped, 4–5 cm. long, 8–10 mm. wide at base, acute; flowering stems about 2 dm. high, reddish, their leaves small and scattered; inflorescence a small compact flat-topped cyme; calyx-lobes broadly ovate, acutish or somewhat obtuse; corolla bright yellow, 8 mm. long, lanceolate, acute, spreading. Sea cliffs, Santa Barbara Island, southern California.

4. *Stylophyllum edule* (Nutt.) Britt. & Rose. Nuttall's *Stylophyllum*. Fig. 2199.

Sedum edule Nutt. in Torr. & Gray, Fl. N. Amer. 1: 560. 1840.

Cotyledon edulis Brewer, Bot. Calif. 1: 211. 1876.

Stylophyllum edule Britt. & Rose, Bull. N.Y. Bot. Gard. 3: 36. 1903.

Echeveria edulis Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 481. 1930.

Caudex stout, bearing a single or few rosettes. Basal leaves nearly terete above the base, 4–8 cm. long, pale green and somewhat glaucous; flowering stems rather stout, 3–5 dm. high, bearing scattered linear leaves from the base to the open paniculate inflorescence; pedicels 1–3

mm. long; calyx-lobes ovate-lanceolate, acute, 3–4 mm. long; corolla yellowish, 6–7 mm. long, the lobes widely spreading, united at base, acute and keeled at apex.

Dry hillsides, Sonoran Zones; western San Diego County, California. April–July.

Stylophyllum Parishii Britt. Bull. N.Y. Bot. Gard. 3: 37. 1903. Closely related to *S. edule*, from which it is distinguished chiefly by the calyx-lobes which are a little larger, mostly oblong-oval and rounded at the apex. Known only from the original collections and possibly not specifically distinct. Palo Canyon, San Diego County, California.

5. *Stylophyllum nudicaule* Abrams. San Gabriel *Stylophyllum*. Fig. 2200.

Cotyledon nudicaulis Abrams, Bull. S. Calif. Acad. 2: 42. 1903. Not Lam.

Stylophyllum densiflorum Rose, Bull. N.Y. Bot. Gard. 3: 36. 1903.

Echeveria densiflora Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 481. 1930.

Echeveria nudicaulis Munz, Man. S. Calif. 214, 598. 1935.

Caudex stout, bearing several rosettes, very glaucous throughout. Basal leaves nearly terete, 6–12 cm. long, acute; flowering stems rather slender and weak, naked below, bearing a few linear leaves above; inflorescence a rather dense cyme, the ultimate branches short, 4–8-flowered, pedicels 1–3 mm. long; calyx-lobes ovate, obtuse; corolla white or tinged with pink, 6 mm. long, the segments spreading, distinct nearly to the base, acute.

Rocky cliffs, Upper Sonoran Zone; San Gabriel Mountains, southern California. June–July.

6. *Stylophyllum Orcuttii* Rose. Orcutt's *Stylophyllum*. Fig. 2201.

Stylophyllum Orcuttii Rose, Bull. N.Y. Bot. Gard. 3: 36. 1903.

Echeveria Orcuttii Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 481. 1930.

Caudex branching and bearing several rosettes. Basal leaves narrowly linear, terete, 3–8 cm. long, very glaucous; flowering stems rather slender, 15–20 cm. high, with scattering short linear leaves; inflorescence of one or two elongated loosely flowered secund racemes; pedicels 1–3 mm. long; calyx-lobes obtuse; corolla rose-colored, 7 mm. long; anthers red.

Gravelly hillsides or rocky ledges, Lower Sonoran Zone; southwestern San Diego County, California, near the international boundary, and the Coronados Islands south to Todos Santos, Lower California. May–July. This species is closely related to *Stylophyllum attenuatum* (S. Wats.) Britt. & Rose of Lower California, which differs chiefly in the acute calyx-lobes and the yellowish corolla, and less glaucous herbage.

6. HASSEÁNTHUS Rose, Bull. N.Y. Bot. Gard. 3: 36. 1903.

Stems arising from globose or oblong corms. Basal leaves narrowly linear, terete or oblanceolate to obovate and slightly flattened; stem leaves ovate to ovate-lanceolate, somewhat clasping, fleshy and rather turgid. Inflorescence cymose. Calyx 5-lobed. Corolla yellow or white tinged with rose, united at base into a short tube, the segments narrow, spreading. Stamens 10, inserted on the corolla-tube. Carpels 5, free or indistinctly united at base, widely spreading. [Name in honor of Dr. H. E. Hasse.]

A genus of three or four species, restricted to southern California and adjacent Lower California. Type species, *Hasseanthus variegatus* (S. Wats.) Rose.

Leaves terete at least toward the apex, the basal linear or narrowly linear-oblanceolate, the cauline sharply acute.

1. *H. elongatus*.

Leaves turgid but distinctly flattened, basal oblanceolate to obovate, obtuse or acutish at apex narrowed below to a very slender petiole exceeding the blade.

Petals and anthers yellow.

2. *H. variegatus*.

Petals white, anthers red.

3. *H. Blochmaniae*.

1. *Hasseanthus elongatus* Rose. Long-stemmed *Hasseanthus*. Fig. 2202.

Hasseanthus elongatus Rose, Bull. N.Y. Bot. Gard. 3: 37. 1903.

Hasseanthus multicaulis Rose, Bull. N.Y. Bot. Gard. 3: 38. 1903.

Hasseanthus variegatus var. *elongatus* Johnston, Bull. S. Calif. Acad. 17: 65. 1918.

Sedum oblongorhizum Berger in Engler & Prantl, Nat. Pflanzenf. ed. 2. 18^a: 445. 1930.

Sedum sanctae-monicae Berger in Engler & Prantl, loc. cit.

Corms oblong, shallow, bearing one to several flowering stems. Basal leaves terete, 3–4 cm. long; flowering stems slender, 10–25 cm. high, variegated, not at all glaucous; stem leaves oblong-ovate, 10–15 mm. long, turgid, tinged with purple; cyme of several elongated, many-flowered secund racemes; flowers subsessile; calyx-lobes ovate, 3 mm. long; corolla yellow, usually streaked with purple, the lobes lanceolate, spreading, 7–8 mm. long; anthers yellow.

Heavy soils, on dry mesas or bluffs; near the coast, Los Angeles County, California. May–June.

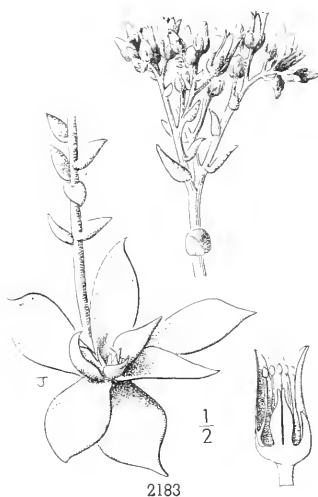
2. *Hasseanthus variegatus* (S. Wats.) Rose. San Diego *Hasseanthus*. Fig. 2203.

Sedum variegatum S. Wats. Proc. Amer. Acad. 11: 137. 1876.

Hasseanthus variegatus Rose, Bull. N.Y. Bot. Gard. 3: 37. 1903.

Basal leaves spatulate, 2–4 cm. long, 2–4 mm. wide, flattened, acutish at apex, narrowed to an elongated slender petiole; flowering stems one to several from an oblong corm, slender, 10–15 cm. high; lower stem leaves slender, about 1 cm. long, those above oblong-lanceolate to oblong-ovate, about half as long, purplish; cyme of 2 or 3 slender elongated spreading racemes; pedicels very short; calyx-lobes ovate, 2 mm. long; corolla yellow, often penciled with purple, the lobes lanceolate, acute, 7 mm. long; stamens nearly as long as the lobes; anthers yellow.

Dry mesas and hillsides, Sonoran Zones; vicinity of San Diego, California. May–June.



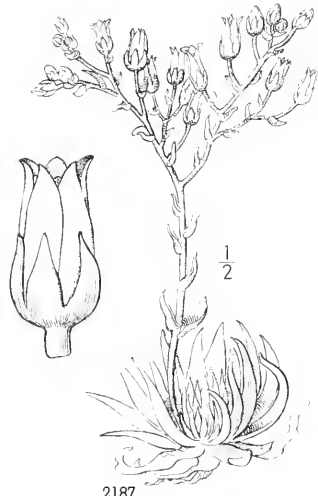
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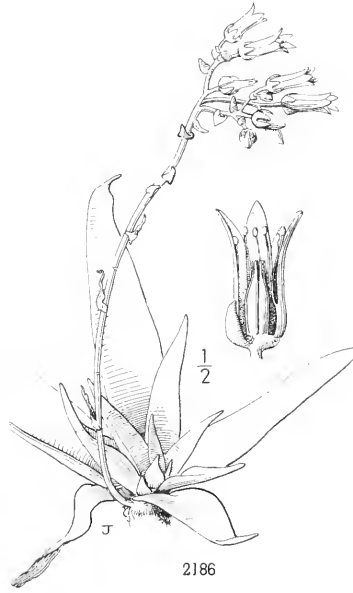
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2183. *Dudleya nevadensis*
2184. *Dudleya gigantea*
2185. *Dudleya Setchellii*

2186. *Dudleya angustiflora*
2187. *Dudleya saxosa*
2188. *Dudleya lanceolata*

2189. *Dudleya grandiflora*
2190. *Dudleya Abramsii*
2191. *Dudleya caespitosa*



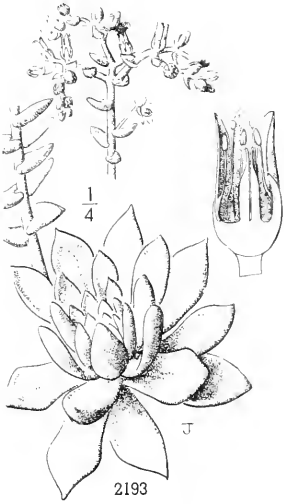
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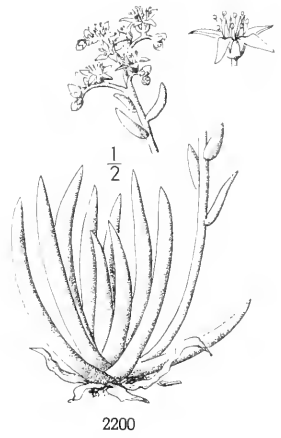
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2192. *Dudleya farinosa*
2193. *Dudleya Greenei*
2194. *Dudleya candelabrum*

2195. *Dudleya Cotyledon*
2196. *Stylophyllum viscidum*
2197. *Stylophyllum albidum*

2198. *Stylophyllum insulare*
2199. *Stylophyllum edule*
2200. *Stylophyllum nudicaule*

3. *Hasseanthus Blochmaniae* (Eastw.) Rose. Blochman's *Hasseanthus*.
Fig. 2204.

Sedum Blochmaniae Eastw. Proc. Calif. Acad. II. 6: 422. 1896.

Hasseanthus Blochmaniae Rose, Bull. N.Y. Bot. Gard. 3: 37. 1903.

Hasseanthus Kessleri Davidson, Bull. S. Calif. Acad. 22: 72. 1923.

Hasseanthus variegatus var. *Blochmaniae* Jepson, Man. Fl. Pl. Calif. 450. 1925.

Sedum Gertrudianum Eastw. Proc. Calif. Acad. IV. 20: 147. 1931.

Corm shallow, subglobose or somewhat fusiform, 1.5 cm. long. Basal leaves 4 or 6, oblanceolate to obovate, turgid but flattened, narrowed below into a slender petiole exceeding the blade; flowering stems one to several, 12–15 cm. high, slender, blotched with purple; stem leaves ovate-lanceolate, fleshy but flattened, acute, the lower 10–15 mm. long; cyme with one or two spreading loosely-flowered secund racemes; pedicels very short, calyx-lobes ovate, 5 mm. long; corolla-lobes broadly lanceolate, 7–8 mm. long, white tinged with pink in age, the midvein purplish; anthers red, orange, or yellow turning dark-purple in age.

Bluffs along the coast, Upper Sonoran Zone; San Luis Obispo County to San Diego, California. May–June.

7. *GORMANIA* Britt. Bull. N.Y. Bot. Gard. 3: 29. 1903.

Low succulent perennial plants, with horizontal rootstocks. Leaves fleshy, spatulate, obovate or nearly orbicular, the stem leaves similar to the basal but smaller. Inflorescence cymose or thyrsoid. Calyx usually deeply 5-lobed, the lobes acute or obtuse. Corolla yellow or red, the lobes 5, united below the middle, somewhat spreading above. Stamens



2201. *Stylophyllum Orcuttii*
2202. *Hasseanthus elongatus*

2203. *Hasseanthus variegatus*
2204. *Hasseanthus Blochmaniae*

2205. *Gormania Watsonii*
2206. *Gormania obtusata*

10, borne on the corolla tube. Carpels 5, united below, erect or nearly so, many-seeded. [Name in honor of Mr. M. W. Gorman, an assiduous collector.]

A genus of about 9 species, natives of the Pacific Coast. Type species, *Cotyledon oregonensis* S. Wats.

Leaves spatulate to obovate-cuneate.

Plants glabrous or glaucous, not glandular-pubescent.

Corolla-segments acute or short-acuminate, little exceeding the stamens.

Corolla yellow.

Corolla-segments united one-third their length or more.

Corolla-segments united one-fourth their length or less.

Corolla rose-red, or white tinged with rose.

Corolla-segments long-acuminate, much exceeding the stamens.

Plants, at least the inflorescence, glandular-pubescent.

Leaves orbicular; flowering stems diffuse.

1. *G. Watsonii*.

2. *G. obtusata*.

3. *G. lava*.

4. *G. oregana*.

5. *G. glandulifera*.

6. *G. debilis*.

1. *Gormanian Watsonii* Britt. Watson's *Gormanian*. Fig. 2205.

Gormanian Watsonii Britt. Bull. N.Y. Bot. Gard. 3: 29. 1903.

Cotyledon oregonensis S. Wats. Proc. Amer. Acad. 17: 373. 1882. Not *Gormanian oregana* (Nutt.) Britt.

Sedum Watsonii Tidestrom, Proc. Biol. Soc. Wash. 40: 119. 1927.

Plants with a stout horizontal rootstock, the flowering stems rather stout, 7–15 cm. high. Basal leaves spatulate, 15–30 mm. long, 6–12 mm. wide at the rounded apex, fleshy, dull green and somewhat glaucous, those of the stem similar but smaller; inflorescence paniculately cymose, usually 6–10 cm. long, many-flowered; calyx-lobes ovate, about 3 mm. long, acute; corolla about 1 cm. long, yellow.

Rocky or gravelly slopes, Boreal Zones; Cascade Mountains from Mount Hood to Crater Lake, Oregon. July–Aug.

2. *Gormanian obtusata* (A. Gray) Britt. Sierra *Gormanian*. Fig. 2206.

Sedum obtusatum A. Gray, Proc. Amer. Acad. 7: 342. 1868.

Gormanian obtusata Britt. Bull. N.Y. Bot. Gard. 3: 29. 1903.

Gormanian Hallii Britt. loc. cit.

Gormanian Burnhamii Britt. op. cit. 3: 30.

Plants with a rather stout horizontal rootstock, the flowering stems 5–15 cm. high. Basal leaves spatulate, 1–2 cm. long, flat but thick and fleshy, rounded at the apex, pale green and somewhat glaucous; inflorescence paniculate-cymose, rather narrow, 2–6 cm. long, the branches ascending; calyx-lobes oblong-ovate, acute, 2–3 mm. long; corolla 5–7 mm. long, pale yellow or cream-colored throughout or pink with cream margins.

Rocky ridges and slopes, Boreal Zones; North Coast Ranges and the Sierra Nevada, California. June–Aug.

3. *Gormanian laxa* Britt. Rose-flowered *Gormanian*. Fig. 2207.

Gormanian laxa Britt. Bull. N.Y. Bot. Gard. 3: 29. 1903.

Gormanian retusa Britt. op. cit. 3: 31. 1903.

Gormanian Eastwoodiae Britt. loc. cit.

Rootstock horizontal; stems erect or ascending, 1–3 dm. high, rather stout, glabrous, pale green or reddish. Leaves of the basal rosettes opposite, those on the flowering stems alternate, broadly obovate-spatulate to cuneate-spatulate, pale green, 15–25 mm. long, 8–18 mm. wide, rounded or retuse at apex, 2–3 mm. thick; cymes several, somewhat paniculate, 5–10 cm. broad; calyx-lobes ovate to ovate-lanceolate, 3–5 mm. long; corolla rose-colored, 7–10 mm. long, the lobes united about one-third their length, oblong-lanceolate, acute; anthers dark red-brown; carpels erect, united at base, reddish.

Rock ledges, Transition Zones; Coast Ranges and Siskiyou Mountains, Josephine County, Oregon, to Mendocino and Lake Counties, California. Type locality: near Waldo, Oregon.

4. *Gormanian oregana* (Nutt.) Britt. Oregon *Gormanian*. Fig. 2208.

Sedum oreganum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 559. 1840.

Gormanian oregana Britt. Bull. N.Y. Bot. Gard. 3: 30. 1903.

Rootstock rather slender, creeping, the flowering stems slender, erect or ascending, often curved, 8–15 cm. long, simple or with 3 or 4 branches from near the middle. Basal leaves spatulate-cuneate, 1–2 cm. long, green and glabrous; inflorescence a rather congested cyme; calyx-lobes lanceolate, acuminate, 4 mm. long; corolla 10–12 mm. long, yellow usually tinged with rose, the lobes united about one-fourth the way, lanceolate, long-acuminate.

Among rocks, Boreal Zones; near the coast from Washington to northern California. July–Aug.

5. *Gormanian glandulifera* (Henderson) Abrams. Glandular *Gormanian*.

Fig. 2209.

Cotyledon glandulifera Henderson, Rhodora 32: 26. 1930.

Perennial with rather long rootstock, whole plant green or often reddish-purple, the upper part including the inflorescence glandular, 15–25 cm. high. Basal leaves oblong-ob lanceolate, 2–3 cm. long, thick but flat, those of the stem shorter; cyme few-branched; pedicels short; calyx-lobes lanceolate, acute, 5–7 mm. long, glandular-ciliate; corolla greenish yellow, 12–14 mm. long, the lobes linear-oblong, erect, acute and apiculate at apex; carpels erect, 10 mm. long, glandular-papillate.

Rock outcrops, Transition Zone; Rogue River region, Josephine County, Oregon.

6. *Gormania debilis* (S. Wats.) Britt. Great Basin *Gormania*. Fig. 2210.

Sedum debilis S. Wats. Bot. King Expl. 102. 1871.

Gormania debilis Britt. Bull. N.Y. Bot. Gard. 3: 30. 1903.

Rootstocks slender, horizontal, usually much branched, flowering stems slender, branched from the base and diffuse, 5–10 cm. high. Lower leaves obovate-orbicular, sessile, 4–8 mm. long, the upper oblong; cyme 2–5 cm. broad; pedicels slender, 3–5 mm. long; calyx-lobes ovate to ovate-lanceolate; corolla yellow, its lobes united at the very base, lanceolate, acuminate, 6–8 mm. long.

Rocky ridges, Boreal Zones; mountain ranges of the Great Basin region, including Idaho, Utah, Nevada, and eastern Oregon. July–Sept.

8. *RHODIOLA* L. Sp. Pl. 1035. 1753.

Perennial fleshy herbs with a woody simple or branched rootstock, and erect or ascending, simple or branched, leafy stems. Leaves cauline, flat and rather thin, sessile, entire or toothed. Inflorescence a terminal often congested cyme. Flowers dioecious or polygamous. Calyx and corolla 4–5-parted. Stamens 8–10. Carpels distinct, erect. [Greek, meaning rose, in reference to the rose-scented roots.]

A genus of about 8 species, natives of the north temperate zone. Type species, *Rhodiola rosea* L.

1. *Rhodiola integrifolia* Raf. Entire-leaved Rosewort. Fig. 2211.

Rhodiola integrifolia Raf. Atlant. Journ. 1: 146. 1832.

Rhodiola rosea var. *integrifolia* Jepson, Man. Fl. Pl. Calif. 450. 1925.

Stems from a fleshy rootstock, usually not over 1 dm. high. Leaves obovate, 10–15 mm. long, sessile, acute, entire or dentate above the middle; cyme dense, small; flowers dioecious, 5-merous or rarely 4-merous; calyx-lobes lanceolate, 2 mm. long or less; petals dark purple or greenish purple, 3 mm. long, those of the pistillate flowers smaller; stamens about one-third the length of the petals; carpels 3–5 mm. long, oblong, tipped with a divergent or recurved beak.

Moist rocky slopes, Boreal Zones; Alaska to the southern Sierra Nevada, California, east to Colorado. May–July.

9. *SĒDUM* [Tourn.] L. Sp. Pl. 430. 1753.

Succulent mostly glabrous herbs with alternate or sometimes opposite, often imbricated leaves. Flowers perfect, in terminal cymes. Calyx 4–5-lobed. Petals 4–5, distinct. Stamens 8–10, the alternate ones attached to the petals, the others to the calyx. Scales of the receptacle entire or emarginate. Carpels 4–5, distinct or united at base, spreading; styles short; ovules many. Follicles few- to many-seeded. [Name Latin, meaning to sit, in reference to the lowly habit of these plants.]

A genus of about 200 species, mainly in the temperate and boreal regions of the northern hemisphere, but a few extending to the Andes of South America. Type species, *Sedum Telephium* L.

Leaves linear or oblong, broadest at or near the base.

Leaves linear and nearly terete; follicles ascending.

Leaves oblong or lanceolate, flattened; follicles divergent.

Leaves oblong, acutish, not keeled on the back.

Leaves linear-lanceolate, acuminate, keeled on the back.

Leaves spatulate to obovate, narrowed to the base.

Follicles erect or ascending.

Flowers white; leaves not glaucous.

Flowers yellow; leaves more or less glaucous.

Follicles widely divergent.

Leaves, at least of the sterile shoots, opposite; branches of the cyme short, mostly simple.

Leaves alternate; branches of the cyme long and forked.

1. *S. stenopetalum*.

2. *S. radiatum*.

3. *S. Douglasii*.

4. *S. niveum*.

5. *S. spathulifolium*.

6. *S. divergens*.

7. *S. Leibergii*.

1. *Sedum stenopetalum* Pursh. Narrow-petaled Sedum or Stonecrop. Fig. 2212.

Sedum stenopetalum Pursh, Fl. Amer. Sept. 324. 1814.

Sedum lanceolatum Torr. Ann. Lyc. N.Y. 2: 205. 1827.

Perennial with slender branching rootstocks, tufted, glabrous. Leaves alternate, crowded, and on sterile shoots even imbricated, sessile, linear, 5–15 mm. long; flowering stems 7.5–20 cm. high; flowers in a compact cyme; pedicels short; calyx-lobes narrowly lanceolate, acuminate, 4 mm. long; petals yellow, narrowly lanceolate, acuminate, 6–7 mm. long; follicles 4 mm. long, their subulate tips divergent.

On rocks, Boreal Zones; British Columbia to Saskatchewan, Nebraska, New Mexico, Nevada, and California. In the Pacific States it is mainly east of the Cascade Mountains ranging from eastern Washington and Oregon to the southern Sierra Nevada, California. West of the Cascades it occurs on the Olympic Mountains and in San Juan County. June–Aug.

Sedum acre L. Sp. Pl. 432. 1753. Densely tufted perennial, the sterile branches prostrate forming mats, the flowering branches erect or ascending, 4–8 cm. high. Leaves especially of the sterile shoots imbricated, alternate, ovate, 4–5 mm. long; cyme usually 2–3-forked; flowers sessile; petals yellow, linear-lanceolate, 5–6 mm. long; carpels widely spreading. A cultivated European species, which has escaped from gardens in some localities in western Washington.



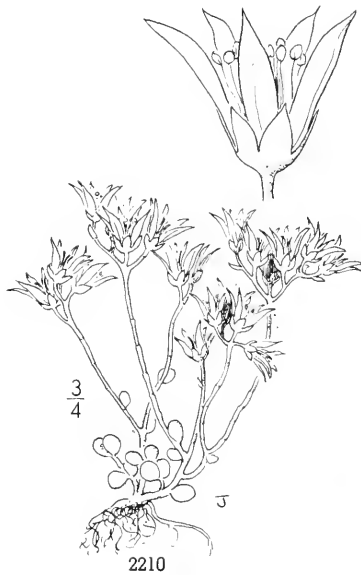
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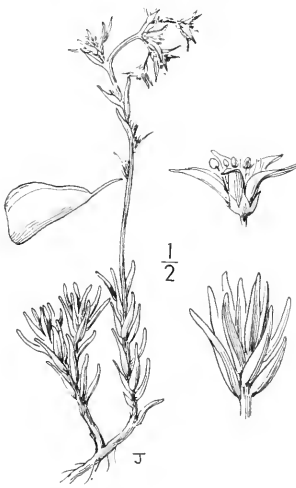
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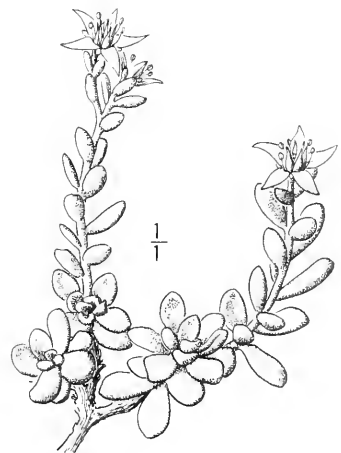
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2207. *Gormania laxa*
2208. *Gormania oregana*
2209. *Gormania glandulifera*

2210. *Gormania debilis*
2211. *Rhodiola integrifolia*
2212. *Sedum stenopetalum*

2213. *Sedum radiatum*
2214. *Sedum Douglasii*
2215. *Sedum niveum*

2. *Sedum radiatum* S. Wats. Star-fruited Stonecrop. Fig. 2213.

Sedum radiatum S. Wats. Proc. Amer. Acad. 18: 193. 1883.

Annual, propagating by deciduous axillary buds, stems simple or branching from the base, 7–18 cm. high. Leaves oblong to oblong-ovate, 5–10 mm. wide, slightly clasping at base, thin and flattened, becoming white-margined, veined and papillose; branches of the cyme 3 to several, elongated; flowers sessile, scattered; sepals triangular-lanceolate, 2 mm. long; petals yellow, widely spreading, narrowly lanceolate, 6–8 mm. long; follicles widely divergent.

Gravelly or rocky soils, Transition Zone; Siskiyou Mountains, southern Oregon, to Monterey County in the Coast Ranges and to Tulare County in the Sierra Nevada, California. June–Aug.

3. *Sedum Douglasii* Hook. Douglas' Stonecrop. Fig. 2214.

Sedum Douglasii Hook. Fl. Bor. Amer. 1: 228. 1832.

Sedum uniflorum Howell, Fl. N.W. Amer. 213. 1898.

Perennial with slender rootstocks, the stems simple or branched, 1–3 dm. high. Leaves narrowly lanceolate or lanceolate-subulate, tapering from the base, 5–20 mm. long, flat, drying thin and scarious with a keel-like midrib, those of the sterile shoots crowded, those of the flowering branches usually with leafy buds in the axils; flowers in a few-forked cyme or sometimes solitary; petals yellow, spreading, narrowly lanceolate, 6–12 mm. long; follicles widely spreading.

Gravelly or rocky slopes, Transition and Canadian Zones; British Columbia to Montana and California. In the Pacific States rather rare in Willamette Valley and Coast Ranges, Oregon, more common in eastern Washington, Oregon, northeastern California, and the Siskiyou Mountains, southern Oregon. May–Aug.

Sedum ciliosum Howell, Fl. N.W. Amer. 214. 1898. Distinguished from *S. Douglasii* chiefly by the leaves, at least the lower ones ciliate on the margins and by the acuminate calyx-lobes about half as long as the petals. Known only from the original collection in the Coast Ranges near Roseburg, Oregon.

4. *Sedum niveum* Davidson. Davidson's Stonecrop. Fig. 2215.

Sedum niveum Davidson, Bull. S. Calif. Acad. 20: 53. 1921.

Prostrate glabrous perennial, the fleshy stems rhizomatous, 1 or more dm. long, giving rise to short ascending branches. Leaves numerous, imbricate on the sterile branches, more distant on the floral ones, 5–7 mm. long, oblong-obovate to obovate, fleshy; flowers solitary or in few-flowered cymes; calyx-lobes lanceolate, 3 mm. long; petals white with a pinkish midvein, lanceolate, 6–7 mm. long; carpels erect.

Shaded rock ledges, mainly Canadian Zone; San Bernardino Mountains, southern California. June–July.

5. *Sedum spathulifolium* Hook. Pacific Stonecrop. Fig. 2216.

Sedum spathulifolium Hook. Fl. Bor. Amer. 1: 227. 1832.

Gormania anomala Britt. Bull. N.Y. Bot. Gard. 3: 30. 1903.

Sedum yosemitense Britt. Bull. N.Y. Bot. Gard. 3: 44. 1903.

Sedum anomalum Britt. N. Amer. Fl. 22: 72. 1905.

Sedum pruinosum Britt. N. Amer. Fl. 22: 72. 1905.

Perennial with slender rootstocks, and propagating by lateral offshoots, flowering stems ascending, simple or branched, 5–15 cm. high. Basal leaves broadly spatulate, 10–25 mm. long, flat, more or less glaucous, cyme with several forks, 5–8 cm. broad; flowers on short stout pedicels; calyx-lobes narrowly lanceolate; petals yellow, narrowly lanceolate, spreading, 8–10 mm. long, carpels slightly spreading.

Rocky ledges and slopes, mainly Transition Zone; British Columbia to southern California in both the Coast Ranges and in the Cascades and Sierra Nevada. May–July.

6. *Sedum divergens* S. Wats. Cascade Stonecrop. Fig. 2217.

Sedum divergens S. Wats. Proc. Amer. Acad. 17: 372. 1882.

Perennial with slender branching rootstocks, the flowering stems erect or ascending, usually decumbent at base, 5–12 cm. high, simple or branching. Leaves, at least those of the sterile shoots, opposite, obovate to broadly so or the upper spatulate, 5–8 mm. long, rounded or obtuse at apex, glabrous; cyme 5 cm. broad or less, rather compact; flowers on short, stout pedicels; calyx-lobes triangular; petals yellow, narrowly lanceolate, spreading, 5–6 mm. long; follicles widely divergent.

Rocky alpine slopes, Boreal Zones; Cascade Mountains, from British Columbia to Mount Hood, Oregon. July–Sept.

7. *Sedum Leibergii* Britt. Leiberg's Stonecrop. Fig. 2218.

Sedum divaricatum S. Wats. Proc. Amer. Acad. 17: 372. 1882. Not Ait. 1789.

Sedum Leibergii Britt. N. Amer. Fl. 22: 73. 1905.

Glabrous perennial with slender rootstocks, the flowering stems simple, erect, 5–15 cm. high. Basal leaves mostly oblanceolate to narrowly obovate, narrowed to a slender elongated base; stem leaves alternate, the lower oblanceolate, the upper oblong and sessile; cyme few-forked, 2–10 cm. broad; flowers very short-pedicelled; calyx-lobes narrowly lanceolate; petals yellow, narrowly lanceolate, acuminate, 6–9 mm. long; follicles widely divergent.

Rocky banks, often growing with moss, Transition Zone; Columbia Basin species extending from the Columbia Gorge eastward through southeastern Washington and northeastern Oregon to adjacent Idaho. May–July.

Family 58. **PARNASSIACEAE.**

GRASS-OF-PARNASSUS FAMILY.

Glabrous scapose herbs, with short perennial rootstocks. Leaves all basal, petioled and entire or often with a single sessile leaf on the scape. Flowers solitary, terminal, white or yellow. Calyx deeply 5-lobed, the short tube free or adnate to the ovary. Petals 5, spreading, with a cluster of gland-tipped staminodia at the base, these distinct or united below to form a scale. Stamens 5, alternating with the petals. Ovary superior or partly inferior; styles short or none; stigmas commonly 4; ovules numerous. Capsule 1-celled, with 3-4 projecting parietal placentae, loculicidally 3-4-valved. Seeds numerous, winged; endosperm none; embryo straight.

A single genus with about 25 species, natives of the north temperate and subarctic regions.

1. **PARNASSIA** [Tourn.] L. Sp. Pl. 273. 1753.

Characters of the family. [Name for Mount Parnassus.]

Besides the following, about 10 other species occur in the Rocky Mountains and eastern North America. Type species, *Parnassia palustris* L.

Petals entire; 3-7-nerved.

1. *P. californica*.

Petals fimbriate on the lateral margins at least toward the base.

2. *P. fimbriata*.

Staminodia with 3 or rarely 5 short lobes.

Staminodia with 7-12 filiform gland-tipped filaments about 2 mm. long.

3. *P. intermedia*.

Leaves ovate to reniform, long-petioled.

4. *P. cirrata*.

Leaves oval, short-petioled.

1. **Parnassia californica** (A. Gray) Greene. California Grass-of-Parnassus.

Fig. 2219.

Parnassia palustris var. *californica* A. Gray, Bot. Calif. 1: 202. 1876.

Parnassia californica Greene, Pittonia 2: 102. 1890.

Rootstock short. Basal leaves narrowly to broadly ovate, cuneate at base, sometimes abruptly so, 2-4 cm. long; petioles 2-15 cm. long; scape 3-6 dm. high; bract ovate, 5-10 mm. long, sessile, above the middle of the scape, sometimes wanting; sepals 4-6 mm. long, oval to oblong; petals 10-15 mm. long, broadly oval to suborbicular, 3-7-veined; filaments subulate, about 8 mm. long; staminodial scales with 15-24 gland-tipped capillary filaments.

Wet places, Canadian and Transition Zones; Josephine County, Oregon, south to San Benito County in the Coast Ranges, and to the southern Sierra Nevada and San Bernardino Mountains, California. Type locality: Sierra Nevada, California. Aug.-Sept.

2. **Parnassia fimbriata** König. Fringed Grass-of-Parnassus. Fig. 2220.

Parnassia fimbriata König, Ann. Bot. 1: 391. 1804.

Rootstock short. Basal leaves reniform to reniform-cordate, 2-4 cm. wide; petioles 5-15 cm. long; scape 2-3 dm. high; bract near the middle of the scape, cordate-clasping, 5-15 mm. long; sepals elliptic to oval, 5-6 mm. long, often with short cilia-like teeth; petals obovate, with a more or less distinct claw, 10-12 mm. long, fimbriate on the lateral margins; filaments filiform, 4-5 mm. long; staminodial scales rather fleshy, with 5-9 short lobes; capsule 8-10 mm. long.

Springs and bogs, Canadian and Hudsonian Zones; Alaska to the Siskiyou and Warner Mountains, California, east to Alberta, Colorado, and Utah. Type locality: Alaska. July-Sept.

3. **Parnassia intermedia** Rydb. Humboldt Grass-of-Parnassus. Fig. 2221.

Parnassia intermedia Rydb, N. Amer. Fl. 22: 78. 1905.

Basal leaves broadly ovate-subcordate to reniform, 15-35 mm. broad; petioles 5-15 cm. long; scape 3-4 dm. long; bract 8-12 mm. long, ovate, rounded or subcordate at base, sessile; sepals oblong-elliptic, about 6 mm. long, entire; petals elliptic to narrowly obovate, about 10 mm. long, fimbriate on the lateral margins, with about 5 principal veins; filaments filiform-subulate, 6-7 mm. long; staminodial scales with about 7-9 filiform gland-tipped filaments; capsule about 1 cm. long, ovoid.

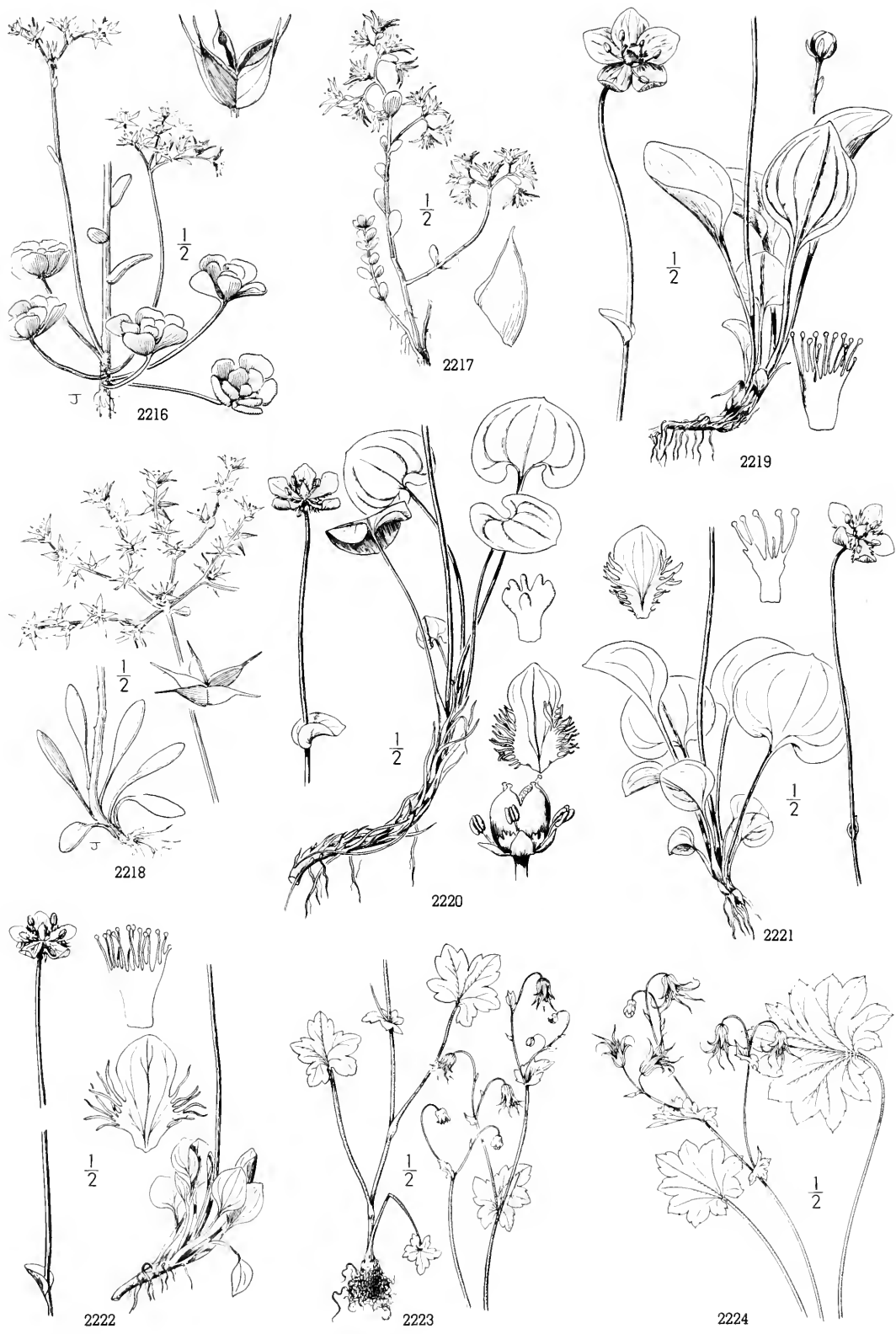
Wet places, Boreal Zones; Mount Hood to Crater Lake, Oregon, and the East Humboldt Mountains, Nevada. Type locality: East Humboldt Mountains, Nevada. July-Aug.

4. **Parnassia cirrata** Piper. San Bernardino Grass-of-Parnassus. Fig. 2222.

Parnassia cirrata Piper, Erythra 7: 128. 1899.

Basal leaves ovate, narrowed at the base, 1-2 cm. long; petioles 2-5 cm. long; scape 2-4 dm. high, bract ovate to lanceolate, 5-10 mm. long; sepals lanceolate to oblong-lanceolate, 6-7 mm. long; petals oblong-obovate, about 1 cm. long, fimbriate with long hairs on the lateral margins; filaments subulate, about equaling the anthers; staminodial scales with about 12 filiform gland-tipped filaments.

Mountain bogs and springs, Transition Zone; Upper Sacramento River, San Gabriel and San Bernardino Mountains, California. Type locality: San Bernardino Mountains. July-Sept.



2216. *Sedum spathulifolium*
2217. *Sedum divergens*
2218. *Sedum Leibergii*

2219. *Parnassia californica*
2220. *Parnassia fimbriata*
2221. *Parnassia intermedia*

2222. *Parnassia cirrata*
2223. *Bolandra californica*
2224. *Bolandra oregana*

Family 59. **SAXIFRAGACEAE.*****SAXIFRAGE FAMILY.**

Annual or perennial caulescent or acaulescent herbs with leaves simple or less often compound, mostly alternate and exstipulate, and commonly all basal. Flowers perigynous, mostly perfect, rarely solitary. Hypanthium usually well developed, 5- (or rarely 4-) lobed, flattish to cylindric, more or less adnate to the base of the ovary. Petals distinct, usually as many as the calyx-lobes and alternating with them, rarely absent. Stamens usually as many, or less often twice as many, as the calyx-lobes (3, more rarely 2, in *Tolmiea*). Pistil mostly of 2 carpels (3 in *Lithophragma*), almost wholly or partially united, or rarely distinct, the placentae parietal (or almost basal) or axile. Ovary 1- or 2-celled, quite superior to wholly inferior. Fruit a capsule or more rarely consisting of separate follicles. Seeds with copious fleshy endosperm.

About 35 genera and 450 species, of wide geographical distribution, mainly restricted to the temperate zones.

Placentae axile.**Stamens 5.**

Ovary free from the hypanthium; petals lance-subulate, more or less purple. 1. *Bolandra*.

Ovary partially adnate to the hypanthium.

Plants with short bulblet-bearing rhizomes; flower-stalk axial.

Ovary half-inferior; blade of the basal leaves ternately divided; stamens borne on the outer edge of a thickened disc. 2. *Hemieva*.

Ovary two-thirds inferior or more; blade of the basal leaves merely crenate; disc obsolete. 3. *Suksdorfia*.

Plants with horizontal rhizomes; flower-stalk a lateral shoot.

Petals withering-persistent; seeds winged. 4. *Sullivantia*.

Petals usually soon deciduous; seeds wingless. 5. *Boykinia*.

Stamens 10; ovary partially adnate to the hypanthium or free.

Flowers on essentially naked scapes, the basal leaves appearing after the flowering stage (except in *Jepsonia malvaefolia*).

Hypanthium well developed, deeply campanulate, longer than or as long as the sepals; leaves reniform or rounded, not peltate, 2.5-8 cm. broad. 6. *Jepsonia*.

Hypanthium only slightly developed, flattish, shorter than the sepals; leaves orbicular-peltate, 1-4 dm. broad. 7. *Peltiphyllum*.

Flowers appearing with or after the leaves; ovary partially adnate to the hypanthium to free except at the very base.

Carpels practically distinct, united only at the very base; leaves leathery. 8. *Leptarrhena*.

Carpels united for at least a fifth of their lengths; leaves not leathery. 9. *Saxifraga*.

Placentae parietal or sometimes nearly basal.

Flowers solitary or clustered in the axils of the upper leaves; calyx-lobes normally 4; petals absent; stamens 4 or 8. 10. *Chrysosplenium*.

Flowers in more or less elongated racemes or panicles; calyx-lobes 5; petals normally present.

Styles normally 3; flower-stalk axial from a slender bulbiferous rhizome. 11. *Lithophragma*.

Styles normally 2; flower-stalk a lateral shoot from a relatively stout scaly rhizome.

Carpels soon very unequally 2-valved to the very base; petals (in ours) entire, filiform or subulate. 12. *Tiarella*.

Carpels essentially equal.

Inflorescence a raceme.

Petals filiform, entire; hypanthium irregular.

Hypanthium cylindric-funnelform, greenish veined and tinged with purple, split almost to the base on the lower side; stamens 3 or, more rarely, 2. 13. *Tolmiea*.

Hypanthium shallowly campanulate, creamy white, only slightly irregular (sepals irregularly grouped); stamens 5. 14. *Bensonia*.

Petals linear or broader, entire or variously lobed to dissected; hypanthium regular.

Petals pinnately cleft or pinnatifid.

Hypanthium deeply campanulate or urceolate, deeper than the length of the calyx-lobes; capsule tapering into the beaks; stamens 10. 15. *Tellima*.

Hypanthium saucer-shaped or open-campanulate, shallower than the length of the calyx-lobes; capsule abruptly beaked or beakless; stamens 5.

Ovary more than half-superior, not flattened above; stigmas entire; youngest flowers at the base of the inflorescence. 16. *Mitellastrum*.

Ovary almost wholly inferior, the top flattened and disc-like; stigmas subsessile, 2-lobed at the apex; youngest flowers at the tip of the inflorescence. 17. *Pectiantia*.

Petals digitately 3-lobed, -cleft, or -parted above, or entire; stamens 5.

Flowering branches leafless. 18. *Ozomelis*.

Flowering branches leafy. 19. *Elmera*.

Inflorescence paniculate, the panicle often spiciform; stamens 5. 20. *Heuchera*.

1. **BOLÁNDRA** A. Gray, Proc. Amer. Acad. 7: 341. 1868.

Perennial glabrous or glandular-puberulent herbs with palmately veined thin leaves

* Text, except for the genus *Heuchera*, contributed by Rimo Bacigalupi.

and a leafy axial stem terminated by a loose panicle of relatively large purplish flowers. Rootstocks short and bulbiferous. Leaves reniform, most of the cauline with conspicuous stipules. Panicle with more or less leafy bracts. Hypanthium deeply urceolate-campanulate, free from the ovary. Sepals 5, long-attenuate. Petals 5, purplish, subulate-lanceolate, long-attenuate, persistent, sessile, alternating with the sepals. Stamens 5, opposite the sepals; filaments subulate to filiform; anthers 2-lobed. Carpels 2, attenuated above, united at the base for one-third to one-fourth their lengths; ovary completely 2-celled; stigmas small, capitate; placentae axile, many-ovuled; seeds pendulous. [Dedicated to Dr. Henry N. Bolander, one of the botanists of the California Geological Survey.]

A genus confined to the Pacific States, containing the two following species. Type species, *Bolandra californica* A. Gray.

Lobes and teeth of the leaves rounded, mucronulate; sepals 3–4 mm. long; carpels connate a third their lengths.
 Lobes and teeth of the leaves triangular, acute; sepals 6–10 mm. long; carpels connate at most a fourth their lengths.

1. *B. californica*.

2. *B. oregana*.

1. *Bolandra californica* A. Gray. Sierra Bolandra. Fig. 2223.

Bolandra californica A. Gray, Proc. Amer. Acad. 7: 341. 1868.

Stems 1–3 dm. high, very slender, glabrous below, glandular-puberulent above. Basal and lower cauline leaves petioled; petioles 2–10 cm. long; blades reniform, thin, glabrous, more or less deeply 5–7-lobed; lobes rounded-ovate, their teeth crenate-serrate and mucronulate; upper cauline leaves sessile, ovate-toothed; the middle ones often auricled by the union of the stipules and the blades; hypanthium proper greenish or purplish, about 5 mm. long; sepals lance-subulate, 3–4 mm. long, often acuminate; petals subulate, more or less attenuate, greenish, the edges and tips purplish, slightly longer than the sepals; filaments narrowly subulate.

In moist places or on wet rocks, mostly confined to the Canadian Zone; Yosemite and Lake Tahoe region of the Sierra Nevada, California. Type locality: "Yosemite Valley, on the Mariposa trail, among rocks." June–July.

2. *Bolandra oregana* S. Wats. Northern Bolandra. Fig. 2224.

Bolandra oregana S. Wats. Proc. Amer. Acad. 14: 292. 1879.

Bolandra innahacensis M. E. Peck, Rhodora 36: 266. 1934.

Stamens 1.5–4 dm. high, glandular-puberulent above, somewhat stoutish toward the base; basal and lower cauline leaves long-petioled; blades reniform with a narrow sinus, thin, glabrous, acutely lobed with many triangular-ovate acute lobes and with smaller acute callus-tipped teeth; middle cauline leaves short-petioled, with very large, foliaceous, acutely and mucronately toothed stipules; upper leaves sessile and often auricled, usually more finely dentate, glandular-puberulent; hypanthium proper greenish or purplish, 5–7 mm. long; sepals linear-lanceolate, long-attenuate, 6–10 mm. long; petals similar but narrower and still more attenuate, dark purple; filaments reddish, filiform.

Rocky banks and cliffs, Humid Transition Zone; northern Oregon and southern Washington, chiefly in the vicinity of the Columbia River Gorge. Also in the Wallowa Mountains and in the Snake River region of eastern Oregon. Type locality: banks of the Willamette River, near Oregon City, Oregon. May–July.

2. *HEMIEVA* Raf. Fl. Tell. 2: 70. 1836.

Glandular-puberulent perennials with fibrous roots from very short bulbiferous rootstocks. Blades of the basal leaves ternately divided to the base, the segments crenately lobed; cauline leaves with more or less well-developed foliaceous stipules. Flowers in a corymbiform panicle. Hypanthium broadly campanulate, adnate to the lower half of the ovary. Sepals 5, triangular-lanceolate. Petals 5, obovate or oval, narrowed to a short broad claw. Stamens 5, opposite the sepals, erect, inserted on the outer margin of a short thick disk; anthers cordate, 2-celled; filaments purplish, subulate-filiform. Ovary half inferior, 2-celled, with axile placentae; styles erect, distinct; stigmas capitate. [Name Greek, meaning half well, probably in allusion to the shallow hypanthium.]

A monotypic genus confined to northwestern North America.

1. *Hemieva ranunculifolia* (Hook.) Raf. Hemieva. Fig. 2225.

Saxifraga ranunculifolia Hook. Fl. Bor. Amer. 1: 246. 1832.

Hemieva ranunculifolia Raf. Fl. Tell. 2: 70. 1836.

Suksdorfia ranunculifolia Engler in Engler & Prantl, Nat. Pflanzenf. 32a: 52. 1890.

Entire plant light green; stem 1–3 dm. high, glandular-pubescent. Basal and lower cauline leaves long-petioled; blades ternately divided to the base, the middle division broadly cuneate and with 3 rounded lobes, 1–2.5 cm. long, the lateral ones oblique and similarly 4-lobed; petioles glandular-pubescent or glabrous, 3–12 cm. long; middle cauline leaves similar but smaller, with shorter petioles which are dilated into foliaceous stipules at their bases; the uppermost merely 3-lobed at the apex and enlarged and auriculate at the sessile base, or simply ovate-lanceolate and not lobed, sessile and without stipules; inflorescence short and subcapitate; hypanthium turbinate, becoming broadly campanulate, including the sepals about 3.5 mm. long; sepals triangular-ovate to oblong, purplish with a green border within; petals white, often purplish at the base, fading to yellowish white, 4–6 mm. long.

Wet rocks in the mountains, Canadian and Hudsonian Zones; Alberta and British Columbia to Montana and the northern Sierra Nevada of California. Type locality: "high ground around Kettle Falls, of the Columbia and on the Rocky Mountains." June–July.

3. SUKSDÓRFIA A. Gray, Proc. Amer. Acad. 15: 41. 1879.

Slender glandular-pubescent perennials with leafy axial flowering shoots from a small bulblet-bearing rootstock. Basal leaves reniform, merely crenate; cauline leaves stipulate. Inflorescence a loose few-flowered panicle. Hypanthium at first obconic-campanulate, becoming more deeply campanulate, in fruit urceolate, adnate to the major portion of the ovary. Sepals 5, oblong-lanceolate, erect. Petals 5, spatulate, entire or 2-3-lobed, attenuated to a long claw, violet. Stamens 5, opposite the sepals; anthers almost sessile. Ovary 2-celled, with many-ovuled axile placentae, almost wholly inferior; styles short, more or less erect; stigmas truncate. Capsule dehiscent between the styles. [Dedicated to Wilhelm Suksdorf, for many years a collector and student of the flora of the Pacific Northwest.]

A monotypic genus restricted to the Pacific Northwest.

1. *Suksdorfia violacea* A. Gray. *Suksdorfia*. Fig. 2226.

Suksdorfia violacea A. Gray, Proc. Amer. Acad. 15: 42. 1879.

Hemieva violacea Wheelock, Bull. Torrey Club 23: 71. 1896.

Slender perennial; stem 1-3 dm. high, more or less glandular-pubescent. Basal leaves reniform with 5-7 rounded lobes, 1-3 cm. wide, more or less puberulent; petioles 2-8 cm. long, glandular-puberulent; lower cauline leaves similar with broad toothed stipules; the upper subsessile, cuneate and 1-4-toothed at the apex, the broad leaf-bases and the foliaceous stipules often coalesced; inflorescence a more or less elongated, long-pedicelled, few-flowered panicle; hypanthium obconic-campanulate, becoming broader, densely glandular, 2-3 mm. long, in fruit urceolate and 4-7 mm. long; sepals oblong-lanceolate, 2-3 mm. long, often longer than the hypanthium; petals violet, 5-7 mm. long, spatulate, long-clawed and almost erect.

Wet rocks near streams, Humid and Arid Transition Zones; Montana westward to the eastern slope of the Cascade Mountains of Washington, south to northwestern Oregon. Type locality: along the Columbia River, in Washington, near the mouth of the White Salmon River. April-June.

4. SULLIVÁNTIA Torr. & Gray, Amer. Journ. Sci. 42: 22. 1842.

Slender perennial herbs with small horizontal rootstocks and more or less leafy stems. Leaves alternate, usually one or two from the base, reniform to orbicular in outline, more or less shallowly lobed and often coarsely toothed, cordate at the base, long-petioled. Flowers small, in paniculate cymes. Hypanthium campanulate, adnate to the lower third to half of the ovary. Sepals 5, imbricate in the bud, erect. Corolla white or whitish, regular. Petals 5, clawed, withering-persistent. Stamens 5, incurved; anthers reniform, 2-celled; filaments short, broadened at the base. Ovary 2-celled, one-third to half inferior, the valves united to the beaks. Follicles erect, well included in the drooping hypanthium, the slightly divergent beaks alone protruding. Seeds wing-margined. [Dedicated to William Starling Sullivan, 1803-1873, an American bryologist.]

A North American genus of three species, two in the Middle West, one of these reaching Wyoming and Colorado, and the following. Type species, *Saxifraga Sullivantii* Torr. & Gray.

1. *Sullivantia oregana* S. Wats. *Oregon Sullivantia*. Fig. 2227.

Sullivantia oregana S. Wats. Proc. Amer. Acad. 14: 292. 1879.

Stems slender, 1-3 dm. high, smooth below, minutely glandular-pubescent above, usually bearing about three leaves. Leaves reniform to reniform-orbicular in outline, 2.5-6 cm. wide, glabrous, laciniately though not deeply cut into broadly cuneate lobes, the lobes coarsely and laciniately toothed; petioles glabrous, 5-10 cm. long, usually much longer than the leaves, with small scarious stipules at their bases; panicle 3-10 cm. long, with the exception of the flowers minutely glandular-puberulent, the peduncles and pedicels subtended by linear-lanceolate foliaceous bracts; hypanthium glabrous, 2-3 mm. long, turbinate-campanulate, becoming rounded at the base in fruit; sepals ovate, about 1 mm. long, 1-nerved and greenish in the center and with a wide colorless margin; petals 1.5-2 mm. long, rhombic-ovate in outline, abruptly narrowed to a short wide claw; follicles about 4 mm. long.

Wet rocks and cliffs, Humid Transition Zone; evidently restricted to the Columbia River Gorge and the lower Willamette River, Oregon. Type locality: banks of the Willamette River, near Oregon City, Oregon. May-July.

5. BOYKÍNIA Nutt. Journ. Acad. Phila. 7: 113. 1834.

Glandular-pubescent perennial herbs with usually a basal tuft of leaves and leafy lateral flowering shoots from a scaly rootstock. Leaves reniform, variously cleft or lobed and dentate or crenate; stipules usually present, either leafy or reduced to bristles. Flowers in a usually leafy-bracteate paniculate or corymbose cyme. Hypanthium campanulate, urceolate or turbinate, adnate to the lower half of the ovary. Sepals 5, lanceolate or ovate-lanceolate, valvate. Petals 5, white, obovate or spatulate, usually narrowed to a claw, usually soon deciduous. Stamens 5, opposite the sepals; anthers 2-celled; filaments short. Ovary and capsule usually 2-celled, opening between the beaks; styles 2, distinct and in fruit forming two divergent beaks. Placentae axile; seeds numerous, ovoid, with

a shining minutely punctate testa. [Dedicated to Dr. Boykin, a physician from Georgia, a contemporary of Nuttall.]

A North American and eastern Asiatic genus of about 8 species. Type species, *Boykinia aconitifolia* Nutt.

Leaves cleft or incised, with acute teeth; petals conspicuously exceeding the sepals.

Stipules, at least the upper, foliaceous, often large.

Stipules small, brown-scarious, mostly reduced to brownish bristles.

Leaves merely crenately lobed, the lobes crenate-serrate with broad mucronate teeth; petals scarcely exceeding the sepals.

1. *B. major*.

2. *B. elata*.

3. *B. rotundifolia*.

1. *Boykinia major* A. Gray. Mountain Boykinia. Fig. 2228.

Boykinia occidentalis var. *elata* A. Gray, Proc. Amer. Acad. 8: 383, in part. 1872.

Boykinia major A. Gray, Bot. Calif. 1: 196. 1876.

Therophon major Kuntze, Rev. Gen. Pl. 1: 227. 1891.

Therophon majus Wheelock, Bull. Torrey Club 23: 70. 1896.

Boykinia major var. *intermedia* Piper, Erythra 7: 172. 1899.

Tall and stout; stem 3–10 dm. high, more or less glandular-villous with brown hairs. Basal and lower cauline leaves long-petioled, with scarious stipules; petioles 1–2 dm. long, also glandular-villous; blades reniform or rounded-cordate in outline, glabrous except on the veins beneath, 5–20 cm. wide, 5–7-cleft from a third to two-thirds of the way down, again cleft and coarsely serrate with lance-ovate gland-tipped teeth; middle cauline leaves similar but with shorter petioles and large foliaceous stipules; the uppermost ovate and sessile, the foliaceous stipules and leaf-blades often connate; inflorescence a relatively dense, many-flowered, cymoid panicle, elongated in fruit, densely glandular-puberulent; hypanthium broadly turbinate-campanulate, becoming urceolate in fruit, without the sepals 2–3 mm. long, glandular-puberulent; sepals triangular-lanceolate, 3 mm. long; petals white, broadly oval or obovate, clawed, 5–7 mm. long.

Along mountain streams and in damp woods, Humid and Arid Transition Zones; Montana westward to Washington and southward to Trinity and Madera Counties, California. Type locality: Sierra Nevada, California. June–Sept.

2. *Boykinia elata* (Nutt.) Greene. Brook Foam. Coast Boykinia. Fig. 2229.

Saxifraga elata Nutt. in Torr. & Gray, Fl. N. Amer. 1: 575. 1840.

Boykinia occidentalis Torr. & Gray, Fl. Amer. 1: 577. 1840.

Boykinia occidentalis var. *elata* A. Gray, Proc. Amer. Acad. 8: 383. 1872.

Boykinia elata Greene, Fl. Fran. 190. 1891.

Therophon occidentale Kuntze, Rev. Gen. Pl. 1: 227. 1891.

Therophon elatum Greene, Man. Bay Reg. 121. 1894.

Boykinia Nuttallii Macoun, Can. Rec. Sci. 6: 408. 1895.

Therophon circinnatum Rosend. & Rydb. N. Amer. Fl. 22: 124. 1905.

Erect and commonly slender; stems sometimes more than one from a branched rootstock, 2–6 dm. high, more or less brown-hairy to glabrate below, densely glandular-puberulent above. Basal leaves thin, glabrous or sometimes sparsely covered beneath by distinct rusty hairs, 2–8 cm. wide, reniform to ovate-cordate, usually shallowly to relatively deeply 5–7-lobed, the lobes serrate with broadly ovate bristle-pointed teeth; their petioles 5–15 cm. long, sparingly pilose with brownish hairs, the stipules brown-scarious, small, the greater portion reduced to several rusty bristles; cauline leaves similar, though successively smaller and with shorter petioles, becoming cuneate at the base, the uppermost rhombic in outline; inflorescence a many-flowered, bracteate panicle, more usually consisting of second racemes, densely glandular-puberulent; bractlets usually foliaceous, spatulate, incised; hypanthium campanulate, 2–3 mm. long, glandular below, often purplish, in fruit becoming urceolate and 3–5 mm. long; sepals lanceolate-acuminate, glabrous, 1.5–2 mm. long; petals white, often pinkish in age, mostly oblanceolate, slightly narrowed to a broad claw, 3–4 mm. long.

Along streams and in damp woods, Humid and Arid Transition Zones; from British Columbia southward in the coastal mountains to Los Angeles County, and inland west of the Cascades to the central Sierra Nevada, California. Type locality: Chinook Point, mouth of the Columbia River. May–July.

3. *Boykinia rotundifolia* Parry. Round-leaved Boykinia. Fig. 2230.

Boykinia rotundifolia Parry ex A. Gray, Proc. Amer. Acad. 13: 371. 1878.

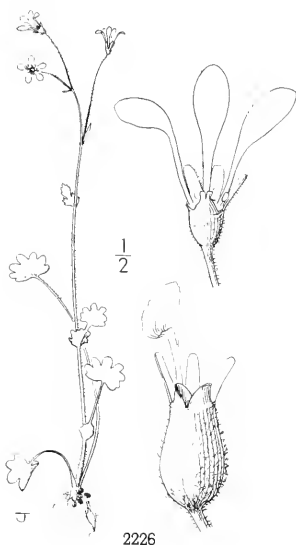
Therophon rotundifolium Wheelock, Bull. Torrey Club 23: 70. 1896.

Very tall and stout; stems 5–10 dm. high, densely glandular-villous. Basal and lower cauline leaves long-petioled, rounded-reniform to almost deltoid, 8–15 cm. wide, with numerous shallow, rounded lobes, glabrate above except on the veins, usually puberulent beneath, the veins more or less hirsutulous; teeth of the lobes crenate-serrate, apiculate; petioles 1–2 dm. long, glandular-villous, the slightly dilated base with brown bristly hairs; upper cauline leaves 3–5 cm. long, short-petioled, orbicular to rhombic in outline; peduncles mostly in the axils of the reduced upper leaves; flowers short-pedicelled, in fruit drooping and second on the elongated branches; hypanthium campanulate-urceolate, 3–4 mm. long, strongly striate, densely glandular-pubescent; sepals ovate-lanceolate, 2 mm. long; petals slightly irregular, obovate-spatulate, 3 mm. long, the claw as long as to slightly longer than the blade.

Banks of streams in canyons, Upper Sonoran and Arid Transition Zones; San Gabriel and San Bernardino Mountains, near Elsinore and in the Cuyama Valley in Santa Barbara County, southern California. Type locality: "Along water-courses, San Bernardino Mountains," California. May–July.



2225



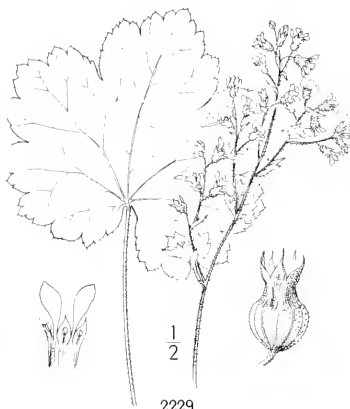
2226



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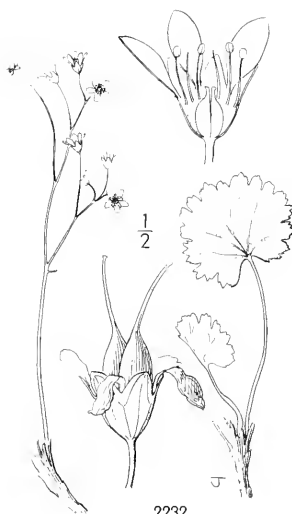
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2225. *Hemieva ranunculifolia*
 2226. *Suksdorfia violacea*
 2227. *Sullivantia oregana*

2228. *Boykinia major*
 2229. *Boykinia elata*
 2230. *Boykinia rotundifolia*

2231. *Jepsonia Parryi*
 2232. *Jepsonia heterandra*
 2233. *Jepsonia malvaefolia*

6. *JEPSÓNIA* Small, Bull. Torrey Club 23: 18. 1896.

Perennial acaulescent herbs with tunicated corm-like rootstocks supporting an often elongated caudex and several slender scapes. Leaves alternate, all basal, reniform in outline, shallowly lobed and toothed, petioled. Flowers in terminal cymes. Hypanthium campanulate, strongly purplish-striate, truncate or acutish at the base, entirely free from the ovary except at the very base. Petals 5, spatulate to oval-elliptic in outline, narrowed to a claw, withering-persistent, adnate to the hypanthium. Stamens 10, shorter than the sepals, the point of attachment of one set immediately below that of the petals; filaments filiform, the bases adnate to the hypanthium. Ovary superior, the two carpels united to about the middle or higher. Carpels veiny, filling and ultimately protruding beyond the hypanthium, the beaks strongly divergent. [Named for Willis Linn Jepson, Professor of Botany at the University of California and authority on California flora.]

A genus of limited distribution, confined to California, the islands off its southern coast and northern Lower California. It consists of the following three species. Type species, *Jepsonia Parryi* (Torr.) Small.

Sepals shorter than the tube of the hypanthium, the latter at anthesis 3–4 mm. long; flowering scapes autumnal, appearing before the leaves which are vernal.

Hypanthium truncate at the base, narrowly campanulate.

Hypanthium acutish at the base, open-campanulate.

Sepals as long as the tube of the hypanthium or slightly longer, the latter at anthesis 2–2.5 mm. long; flowering scapes appearing at the same time as the basal leaves.

1. *J. Parryi*.

2. *J. heterandra*.

3. *J. malvaefolia*.

1. *Jepsonia Parryi* (Torr.) Small. Coast Jepsonia. Fig. 2231.

Saxifraga Parryi Torr. Bot. Mex. Bound. 69. 1859.

Jepsonia Parryi Small, Bull. Torrey Club 23: 18. 1896.

Caudex clothed with the firm persistent leaf-bases. Leaves vernal, erect, reniform, distinctly broader than long, sparingly glandular-puberulent, hirsutulous on the veins, 2–8 cm. broad, shallowly lobed and crenately toothed, the teeth apiculate, shallowly to deeply cordate at the base, the sinus usually wide and open; petioles hirsute to glabrate, widened toward the base, 2–6 cm. long; scapes autumnal, often tufted, wiry, 1–3 dm. tall, glandular-puberulent to glabrate in age; hypanthium narrowly campanulate, strongly purple-striate, truncate at the base, including the short ovate sepals 6 mm. long; petals obovate to oval, narrowed to short claws, lightly purplish-veined, 4–6 mm. long; fruiting carpels flat at the base, protruding beyond the hypanthium, about 7 mm. long, dimorphous, the reniform stigmas subsessile on the broadish beaks in one form, raised on elongated style-like beaks in the other.

Dry slopes, Lower and Upper Sonoran Zones; mountains of southwestern San Bernardino County southward to San Diego County, California, and adjacent Lower California. Type locality: dry hills near San Diego and San Luis Rey, California. Nov.–Dec.

2. *Jepsonia heterandra* Eastw. Foothill Jepsonia. Fig. 2232.

Jepsonia heterandra Eastw. Bull. Torrey Club 32: 201. 1905.

Jepsonia Parryi var. *heterandra* Jepson, Man. Fl. Pl. Calif. 457. 1925.

Caudex often thick and woody, scaly. Leaves vernal, erect or ascending, suborbicular to rounded-reniform, 3.5–6 cm. broad, shallowly lobed and toothed, more or less pubescent about the veins beneath, cordate at the base, the basal lobes sometimes overlapping; petioles usually hirsute, 2.5–5 cm. long; scapes autumnal, often tufted, 1–3 dm. high, puberulent to glabrate in age; hypanthium ultimately scarious, open-campanulate, acutish at the base, purplish-striate, including the broadly ovate to triangular-acute sepals 4–5 mm. long, the latter 1–2 mm. long; petals 5–6 mm. long, ovate to oval, narrowed to short claws; anthers oblong and acutish at the apex to orbicular; filaments of varying lengths on the same flower; carpels strongly reddish-striate, in fruit long-exserted beyond the hypanthium, 5–6 mm. long, the strongly divergent beaks dimorphous, very slender and almost filiform, and slightly shorter than the bodies in one form, much shorter and broader, 1 mm. or less long in the other.

Dry rocky outcrops, Upper Sonoran Zone; lower Sierra Nevada foothills, Eldorado County to Mariposa County, California. Type locality: banks of the Merced River, near Benton's Mills (Bagby), Mariposa County, California. Aug.–Dec.

3. *Jepsonia malvaefolia* (Greene) Small. Island Jepsonia. Fig. 2233.

Saxifraga malvaefolia Greene, Bull. Torrey Club 9: 121. 1882.

Jepsonia malvaefolia Small, Bull. Torrey Club 23: 19. 1896.

Jepsonia neontalliana Millsp. Field Mus. Bot. Ser. 5: 124. 1923.

Aerial parts annual from a stout corm-like rootstock, the habit essentially that of the two preceding; younger parts glandular-puberulent. Leaves appearing with the scapes after the first rains, ovate-orbicular to orbicular-reniform, shallowly cordate at the base, 2–3.5 cm. wide, hirsutulous on the veins beneath, irregularly and more sparsely hirsutulous above, closely serrate-dentate toward the base, the shallow crenate obscure lobes irregularly and closely serrate-dentate; petioles densely hirsutulous, more or less channelled, narrowly scarious-dilated at the base, 2.5–4 cm. long; scapes very slender, 8–20 cm. tall; inflorescence at first a subcongested cymose panicle; hypanthium strongly striate, widely campanulate, mostly truncate or sometimes acutish at the base, the narrowly oblong sepals as long as to often slightly longer than the tube; petals oval-elliptic, conspicuously purplish-veined, about 3.5 mm. long, the claw short and broad; carpels at anthesis united for two-thirds of their lengths, the stigmas subsessile on stout beaks or tipping slender style-like beaks.

Canyon banks and open mesas, Upper Sonoran Zone; Channel Islands (Santa Cruz, Santa Rosa and Santa Catalina Islands) off the coast of southern California, and on the mainland in western San Diego County (vicinity of Hodges Dam), California. Type locality: Santa Rosa Island. Nov.–Dec.

7. **PELTIPHÝLLUM** Engler in Engler & Prantl, Nat. Pflanzenf. 3^{2a} : 61. 1890.

Coarse acaulescent perennial herbs with thick fleshy horizontal rhizomes. Leaves basal, orbicular-peltate, cupped at the center, terminating long fleshy broadly stipular petioles. Scapes somewhat surpassing the leaves, occasionally bearing one or two very much reduced broadly stipular leaves. Inflorescence composed of broad corymbose cymes. Hypanthium small, flattish, shorter than the 5 sepals, these becoming reflexed. Corolla white, aging pinkish, regular. Petals 5, broad, sessile. Stamens 10; filaments subulate. Ovary adnate to the hypanthium only at the base; carpels free save at the base, in fruit nearly distinct and more or less spreading. [Name Greek, meaning peltate leaf.]

A monotypic genus confined to California and adjacent Oregon.

1. **Peltiphyllum peltatum** (Torr.) Engler. Umbrella Plant, Indian Rhubarb. Fig. 2234.

Saxifraga peltata Torr. ex Benth. Pl. Hartw. 311. 1849.

Leptarrhena inundata Behr ex Kell. Proc. Calif. Acad. 1: 45. 1855.

Peltiphyllum peltatum Engler in Engler & Prantl, Nat. Pflanzenf. 3^{2a} : 61. 1890.

Tufted plant 3–10 dm. high. Leaf-blades 1–4 dm. broad, crenately to more acutely lobed, the lobes unequally and often sharply serrate-dentate, glabrous except occasionally on the prominent veins beneath; petioles evenly though not densely glandular-scabrous; scapes appearing before the leaves (these appearing after anthesis), erect, sparsely to relatively densely brownish-pubescent with broadish hairs; sepals ovate to oblong-ovate, 3–4 mm. long, obtuse, glandular-ciliate; petals oval-orbicular to oblong-obovate, 5–7 mm. long; carpels 8–11 mm. long, becoming reddish.

In streams and along stream banks, Upper Sonoran and Transition Zones; southwestern Oregon southward in the Coast Ranges to Humboldt County and in the Sierra Nevada to Tulare County, California. Type locality: "Pine Creek," Butte County, California. April–July.

8. **LEPTARRHÈNA** R. Br. Chlor. Melv. 15. 1823.

Perennial caulescent herbs with short leafy caudices and sparingly leafy flower-stalks. Leaves alternate, approximate on the caudex, remote and very few on the flower-stalk; blades leathery, toothed, narrowed into petiole-like bases. Flowers in a dense short panicle, elongating in fruit to a number of dense cymes. Hypanthium flattish, about the length of the calyx. Sepals 5, erect. Corolla white, regular. Petals 5, narrow, broadened upward, persistent. Stamens 10, with subulate filaments. Lower fifth of the ovary (only the very base in fruit) adnate to the hypanthium, the carpels coalesced only at the base, erect except for the slightly divergent tips. Seeds scurfy, elongated-subulate, the testa prolonged on either end of the seed proper. [Name Greek, meaning thin or delicate and male, probably in reference to the slender stamens.]

A monotypic genus, native of northeastern Asia and coastal northwestern North America.

1. **Leptarrhena pyrolifolia** (D. Don) R. Br. Leather-leaved Saxifrage. Fig. 2235.

Saxifraga pyrolifolia D. Don, Trans. Linn. Soc. 13: 389. 1822.

Saxifraga amplexifolia Sternb. Rev. Saxifr. Suppl. 1: 2. 1822.

Leptarrhena pyrolifolia R. Br. ex Ser. in DC. Prod. 4: 48. 1830.

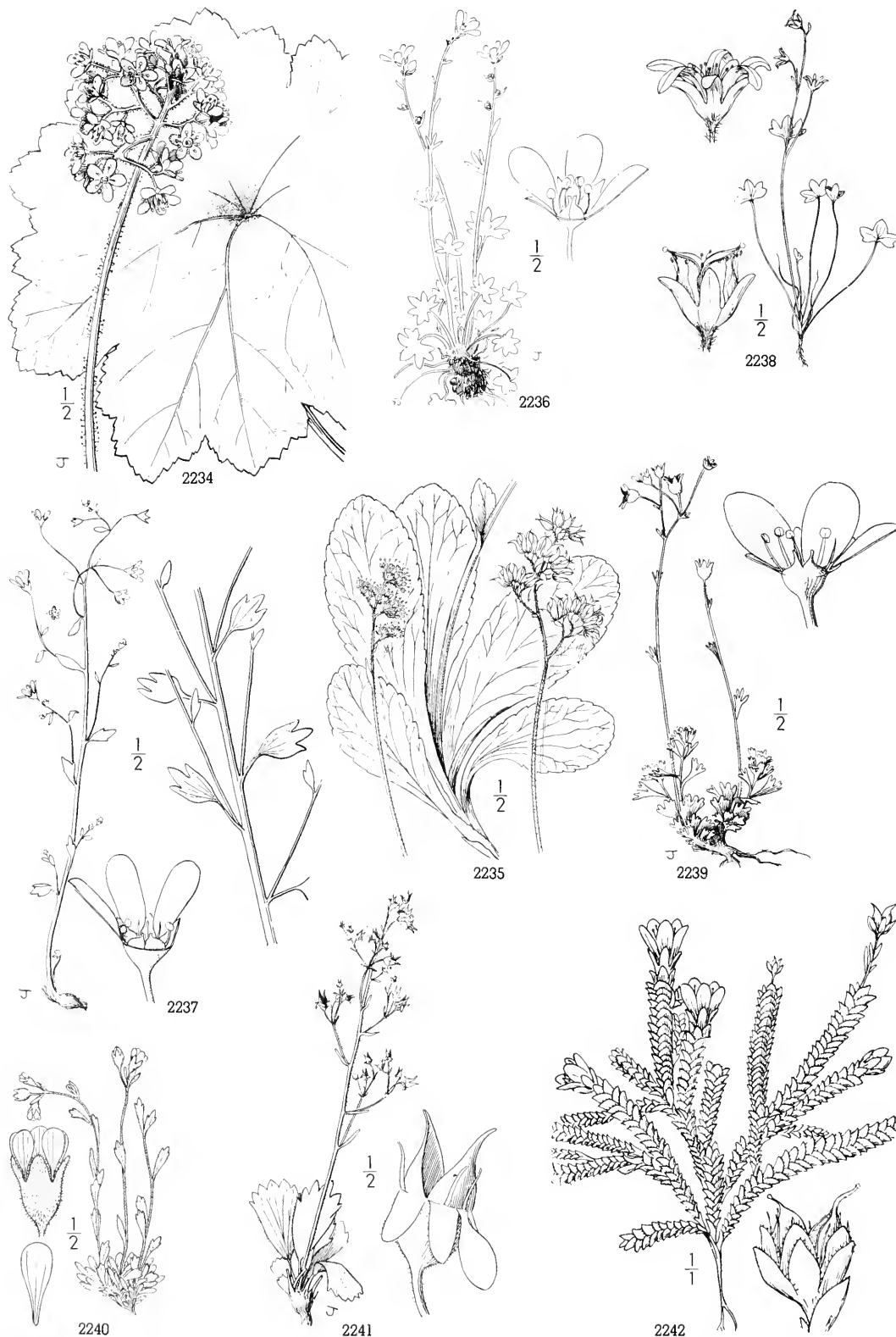
Leptarrhena amplexifolia R. Br. ex. Ser. in DC. loc. cit.

Caudex horizontal or ascending, stoutish, covered by the imbricated bases of the petioles. Leaf-blades leathery, oblong to obovate, serrate to crenate-serrate except toward the base, glabrous, deep green or lustrous above, paler and often brownish beneath, 3–12 cm. long, narrowed into stout winged petioles, these sometimes sparingly ciliate; flower-stalks 1–4.5 dm. tall, more or less glandular-pubescent, bearing one or two small auriculate-clasping leaves; cymules at first congested into a thyrsoid panicle, becoming separated; peduncles 5–25 mm. long, these and the pedicels more or less densely glandular-pubescent; sepals ovate, whitish, slightly longer than the mostly glabrous hypanthium, each with a terminal sessile gland and often a few lateral glands; petals narrowly spatulate to oblong-oblancheolate, white, sometimes slightly pink-tinged, 2–2.5 mm. long; carpels conic-ovoid, 8–10 mm. long, purple or merely pink-tinged.

Along streams, Boreal Zones; Kamchatka, Aleutian Islands, and southward along the coast of Alaska and British Columbia to Mount Adams, Washington. Type locality: Kamchatka and Unalaska. July.

9. **SAXÍFRAGA** L. Sp. Pl. 398. 1753.

Herbs, mostly perennial, with alternate, opposite or basal, entire, toothed or pinnatifid leaves and corymbosely paniculate or solitary perfect flowers. Hypanthium weakly to well developed, adnate to at least the base of the ovary. Sepals 5. Petals 5, perigynous. Stamens 10, inserted with the petals; filaments subulate or broadened upward and somewhat petaloid; anthers 2-celled. Ovary almost superior to partly inferior, 2-celled (at least at the base), 2-lobed at least at the summit (3 to 5 carpels in aberrant flowers); capsule-beaks short; stigmas truncate or capitate. Placentae axile. Capsule 2-beaked, many-



2234. *Peltiphyllum peltatum*
2235. *Leptarrhena pyrolifolia*
2236. *Saxifraga cernua*

2237. *Saxifraga Nuttallii*
2238. *Saxifraga debilis*
2239. *Saxifraga caespitosa*

2240. *Saxifraga adscendens*
2241. *Saxifraga fragarioides*
2242. *Saxifraga oppositifolia*

seeded, dehiscing along or between the beaks. Seeds small, the testa roughened or smooth. [Name Latin, meaning stone-breaking, said by some to refer to the fact that many of the species grow in rock-clefts, by others to the supposition that certain species would cure stone in the bladder.]

About 250 species, many circumboreal and nearly all restricted to the north temperate zone. Besides the following, about 40 species occur in the more easterly and northerly parts of North America. Type species, *Saxifraga granulata* L.

Hypanthium turbinate to campanulate, well developed in mature flowers, ultimately longer than the sepals; flowering stems leaf-bearing.

Petals deciduous, not reflexed, the claw, if present, very short and broad.

Plants without caudex, producing only annual flowering stems from a slender rootstock.

All but the relatively large terminal flower regularly replaced by conspicuous bulblets; plants more or less glandular-pubescent. 1. *S. cernua*.

Flowers not replaced by bulblets; plants almost or quite glabrous.

Sepals acuminate to merely acute; cauline leaves longer than wide, sharply 3-lobed at the apex. 2. *S. Nuttallii*.

Sepals obtuse; at least the lower cauline leaves wider than long, crenately lobed. 3. *S. debilis*.

Plants with perennial leafy caudices, often with offsets, the flowering stems sharply differentiated from the basal portions of the plants.

Leaves spatulate to flabellate, digitately cleft at the apex; petals 5-7 mm. long. 4. *S. caespitosa*.

Leaves entire, a few of the larger cauline with a pair of shallow teeth toward the apex; petals 3-5 mm. long. 5. *S. adscendens oregonensis*.

Petals withering-persistent, distinctly and narrowly clawed, reflexed at maturity; leaf-blades broadly cuneate, finally disarticulating from the petiole. 6. *S. fragarioides*.

Hypanthium shallow, only slightly developed, remaining relatively shallow even in fruit.

Leaves opposite, densely imbricated and decussately 4-ranked on the sterile branches and flowering stalks; petals purple, fading to lilac; densely matted perennial. 7. *S. oppositifolia*.

Leaves alternate or basal; petals white or yellow.

Leaf-blades fan-shaped to obovate-cuneate, sharply dentate except at the base; the petioles dilated above; primary branches of the inflorescence ultimately elongated and ascending. 8. *S. Lyallii*.

Leaf-blades orbicular or reniform to oblong or lanceolate, never fan-shaped or obovate-cuneate; petioles not markedly dilated above.

Blades of the leaves at least as broad as long, reniform to orbicular, more or less cordate to truncate at the base.

Leaves orbicular to reniform-orbicular, more or less sharply dentate; petals white; filaments petaloid; relatively robust perennials.

Leaves without stipules, simply and almost evenly dentate with roundish gland-tipped teeth; scapes from a slender horizontal rhizome.

Petals suborbicular to elliptic-obovate, with abrupt and slender claws; inflorescence elongate, widely paniculate-cymose. 9. *S. arguta*.

Petals elliptic-oblong to ovate, gradually narrowed into short relatively stout claws; inflorescence short, closely corymbose. 10. *S. aestivalis*.

Leaves with stipular dilations at the base of the petioles, the blades of at least the larger leaves with the main teeth in turn 3-dentate; scapes from an erect bulb-like rootstock. 11. *S. Mertensiana*.

Leaves, particularly the basal, truly reniform (much broader than long), not at all orbicular, shallowly and crenately 3-5-lobed; petals yellow; filaments subulate, not petaloid; very delicate annual or biennial. 12. *S. Sibthorpii*.

Blades of the leaves longer than broad.

Caudices producing more or less horizontal perennial branches, these densely beset with small leaves; plants suffrutescent at the base.

Leaves thickest, fleshy, semi-terete, often slightly revolute, eciliate; petals uniformly white; filaments petaloid, broadened above. 13. *S. Tolmiei*.

Leaves relatively thin, parchment-like, spinulose-ciliate and cuspidate; petals veined and often spotted with maroon; filaments subulate. 14. *S. bronchialis austromontana*.

Caudices not producing horizontal perennial branches; plants herbaceous throughout.

Petals mostly dissimilar, 3 of them broader than the other 2; floral bulblets often present.

Plants (the caudex) perennial; scapes 1-4 dm. high; leaves spatulate, sharply toothed above the middle; pedicels at least not consistently or strikingly deflexed, the lateral often bulblet-bearing. 15. *S. ferruginea*.

Plants annual; scapes 0.5-2 dm. high; leaves linear-elliptic to oblong-oblancoate, mostly entire; pedicels soon deflexed, all but the terminal bulblet-bearing. 16. *S. bryophora*.

Petals essentially alike; floral bulblets not present; plants from a perennial caudex.

Petals not markedly longer, or very often shorter, than the sepals; inflorescences often head-like or umbel-like.

All the petals slightly and consistently longer than the sepals; scapes essentially and peduncles and pedicels wholly glabrous and non-glandular; inflorescence aggregated into a head-like or umbel-like cyme. 17. *S. aprica*.

Petals varying from slightly shorter to slightly longer than the sepals; scapes and peduncles (and often the pedicels) glandular-pubescent and puberulent.

Longest petals about equaling the sepals; congested cymules approximate in a narrowly pyramidal cyme. 18. *S. columbiana*.

Longest petals slightly longer than the sepals; cymules congested, the lower at anthesis separated from the others by the elongation of the peduncles. 19. *S. nidifica*.

Petals markedly longer than the sepals, conspicuous; inflorescences not head-like or umbel-like; scapes and peduncles mainly glandular-pubescent.

Cymules more or less compact at maturity, in narrowly pyramidal or corymb-like clusters.

Leaves gradually narrowed to the base, almost or usually quite without petioles; robust plants, mostly 4-8 dm. tall. 20. *S. oregana*.

Leaves mostly narrowed to distinct petioles; plants not strikingly robust, usually 1–4 dm. high.

Basal leaves almost subcoriaceous, usually shortly and densely viscid-hirsutulous on the upper surface, the blades oblong-elliptic to ovate-elliptic, more or less abruptly contracted into petioles mostly shorter than the blades. 21. *S. integrifolia*.

Basal leaves usually fleshy, glabrous or rarely sparsely pubescent on both surfaces, the petioles mostly as long as to longer than the oblong-ovate to deltoid-ovate blades. 22. *S. fragosa*.

Cymules open and often raceme-like at maturity.

Leaf-blades of a distinctly cuneate type, coarsely crenate or serrate-dentate; plants 6–15 cm. tall. 23. *S. Howellii*.

Leaf-blades not of a cuneate type.

Sepals reflexed, at least after anthesis.

Filaments broadened upward, narrowly petaloid; petals with 2 yellowish-green spots toward the base; leaf-blades ovate to oblong-ovate, coarsely dentate, crenate or crenate-dentate. 24. *S. Marshallii*.

Filaments subulate, narrowed rather than broadened above; petals white throughout; leaf-blades oblong-obovate to elliptic, sinuately or repandly toothed. 25. *S. californica*.

Sepals not reflexed, mostly erect even in fruit; leaf-blades coarsely serrate or crenate-serrate to crenate.

Petals obovate-oblong to narrowly oblong, $2\frac{1}{2}$ to 4 times as long as the sepals; leaf-blades thin, very sparingly, when at all, pubescent. 26. *S. fallax*.

Petals oval to obovate, at most twice as long as the sepals; leaf-blades thick, usually densely rusty-pubescent on the lower surface. 27. *S. occidentalis rufidula*.

1. *Saxifraga cernua* L. Nodding Saxifrage. Fig. 2236.

Saxifraga cernua L. Sp. Pl. 403. 1753.

A more or less glandular-pubescent caulescent perennial herb from a small rootstock, usually growing in clumps, the rootstock usually beset with bulblets; stems leafy, 8–20 cm. tall, unbranched. Leaf-blades reniform, the upper cauline becoming rhomboidal to oblong, the basal and lower cauline crenately to digitately 3–7 lobed, 1–2 cm. wide, on petioles 1–5 cm. long, the upper cauline becoming sessile and bulblet-bearing; flowers solitary and terminal, the hypanthium very little developed at anthesis, becoming bowl-shaped and 5 mm. wide; sepals oblong to oblong-lanceolate, 3–4 mm. long, becoming broadly ovate as the hypanthium develops; petals cuneate-oblong, white, 6–8 mm. long, clawless. Fruit often not developing.

Rock crevices and meadows, Boreal Zones; circumboreal, extending southward in North America to Labrador, Colorado, and but recently collected in northwestern Okanogan County, Washington. Type locality: Lapland. July–Aug.

2. *Saxifraga Nuttallii* Small. Nuttall's Saxifrage. Fig. 2237.

Saxifraga elegans Nutt. in Torr. & Gray, Fl. N. Amer. 1: 573. 1840. Not Sternb. 1831.

Saxifraga Nuttallii Small, Bull. Torrey Club 23: 368. 1896.

Cascadia Nuttallii A. M. Johnson, Amer. Journ. Bot. 14: 38. 1927.

Saxifraga Nuttallii var. *macrophylla* Engler & Irmsch. Pflanzenreich 4¹¹⁷: 231. 1916.

Glabrous caulescent perennial herb from a small rootstock; stems slender, 0.5–3.5 dm. tall, leafy, paniculate above. Leaf-blades oval to cuneate-oblong, the larger shallowly 3-lobed toward the apex, 4–12 mm. long, the lower narrowing to a distinct petiole, the upper inclined to be less and less petiolate; flowers few, in axillary and terminal elongated leafy-bracted racemes or panicles; pedicels filiform, 3–20 mm. long; hypanthium campanulate, including the sepals about 3 mm. long, becoming 4.5 or even 6 mm. long in fruit, glabrous; sepals nearly deltoid, 1–1.5 mm. long, acuminate or merely acute; petals oblong to oblanceolate, clawless, with 3 purple veins, 4–5 mm. long; ovary adnate to the hypanthium for about half its length, the carpels united to about the middle, in fruit 4–5 mm. long.

On wet banks and cliffs, Humid Transition Zone; apparently local, restricted to the hill country about the Willamette Valley, Oregon, and reappearing about Gray's Harbor, Washington. Type locality: banks of the Columbia, near the mouth of the Willamette River. May.

3. *Saxifraga debilis* Engelm. Pigmy Saxifrage. Fig. 2238.

Saxifraga debilis Engelm. in A. Gray, Proc. Acad. Phila. 1863: 62. 1863.

Saxifraga cernua var. *debilis* Engler, Monogr. Saxifr. 107. 1872.

Saxifraga rivularis Jepson, Fl. Calif. 2: 121. 1936. Not L.

Delicate loosely tufted glabrous to glandular-pubescent herb from a small perennial rootstock; stems 3–10 cm. tall, erect or ascending, very slender, leafy, usually several from the same rootstock, sparingly branched above, the branches ascending, 1–3 cm. long, bearing a solitary flower. Basal leaf-blades thin, reniform to orbicular-reniform, 6–14 mm. wide, crenately and mostly 5-lobed, truncate to slightly cordate at the base, the slender petioles 1–2.5 cm. long, their scarious dilated bases thickly imbricated on the lower portion of the stem; upper leaves increasingly smaller, becoming rhombic-ovate and entire, shortly petiolate; hypanthium turbinate-campanulate, 3–4 mm. long at maturity; sepals oblong-ovate, 1.5–2 mm. long, obtuse; petals white, spatulate-oblong, 3–6 mm. long, the abrupt claw broadish and very short; ovary at maturity one-half to two-thirds inferior, 6–7 mm. long, the carpels united except for the strongly divergent styles.

Moist locations, Boreal Zones; of very local distribution within our limits, distributed from British Columbia southward to the Mount Rainier region, the Blue and Wallowa Mountains of eastern Washington and Oregon, and recently collected at several points along the crest and eastern slopes of the Sierra Nevada of California. It is more abundant in the Rocky Mountains of Colorado and Utah, and has also been collected on San Francisco Mountain, Arizona. Type locality: Colorado. July–Aug.

4. *Saxifraga caespitosa* L. Tufted Saxifrage. Fig. 2239.

Saxifraga caespitosa L. Sp. Pl. 404. 1753.

Muscaria emarginata Small, N. Amer. Fl. 22: 130. 1905.

Densely tufted caulescent perennial herb from a woody, often branching rootstock; caudices 3–7 cm. tall, densely beset with more or less imbricated leaves. Leaves persistent, spatulate to flabellate, thin, ciliate, sparsely pubescent, yellow-green, 8–15 mm. long, usually 3-cleft at the apex about a fourth of the way down, the digitate lobes roundish and obtuse to linear and acute; flower-stalks slender, glandular-pubescent, leafy-bracted and usually bearing 1–3 cleft leaves below, 1–6-flowered, 2–10 cm. high; hypanthium rounded or less commonly turbinate at the glandular-pubescent base, including the sepals 2.5–6 mm. long at maturity; sepals ovate to ovate-lanceolate, 2–3 mm. long, obtuse or acutish; petals white, obovate to oblong-obovate, rounded at the apex, the bases often somewhat cuneate, 5–7 mm. long; capsule 5–7 mm. long, the lower two-fifths adnate to the hypanthium.

Rocky slopes and cliffs, Humid Transition to Arctic-Alpine Zones; Greenland and Newfoundland west through subarctic America to Alaska, south to Jackson County, Oregon, and in the Rocky Mountains to Colorado and Arizona. Also in arctic and alpine Europe and Siberia. Type locality: Europe. June–Sept.

5. *Saxifraga adscendens* subsp. *oregonensis* (Raf.) Bacigalupi. Wedge-leaved Saxifrage. Fig. 2240.

Saxifraga adscendens of western American authors, not L.

Ponista oregonensis Raf. Fl. Tell. 2: 66. 1836.

Muscaria adscendens Small, N. Amer. Fl. 22: 129. 1905.

Saxifraga oregonensis A. Nels. Bot. Gaz. 42: 52. 1906.

Saxifraga incompta M. E. Peck, Rhodora 36: 267. 1934.

A diminutive densely tufted glandular-pubescent perennial from a slender caudex; stems 2–8 cm. tall, often densely leafy. Basal leaves densely imbricated, oblong-spatulate, hispid-ciliolate, entire or rarely 3-toothed at the tip, 0.5–1.5 cm. long; cauline leaves often purplish, narrowly cuneate, 3-toothed above; inflorescence a compact leafy-bracteate cyme; hypanthium purplish, turbinate-campanulate, 2.5–3 mm. long; sepals oblong-ovate to ovate, about 1.5 mm. long; petals white with 3 greenish nerves, narrowly obovate with a spatulate base, sessile, 3–5 mm. long.

Wet, gravelly or rocky places, Boreal Zones; British Columbia southward in the Cascade Mountains to Mount Baker, Washington, and in the Rocky Mountains to the Wallowa Mountains of eastern Oregon, Colorado, and Utah. Type locality: "Mts. Oregon of North America." July–Aug.

6. *Saxifraga fragarioides* Greene. Joint-leaved Saxifrage. Fig. 2241.

Saxifraga fragarioides Greene, Bull. Torrey Club 8: 121. 1881.

Saxifragopsis fragarioides Small, Bull. Torrey Club 23: 20. 1896.

Sometimes glandular perennial herb with sparingly leafy-bracted flowering stems arising from a stoutish horizontal rootstock or from an ascending caudex. Leaves mostly at the base of the flowering stem and more or less crowded on the caudex; blades cuneate, thinnish, rather prominently and flabellately veined, coarsely dentate at the apex or above the middle, the sides below this entire, 1.5–4.5 cm. long, ultimately disarticulating from the petiole; petioles about as long as the blade, channelled above, with a scarious dilated base, persistent and densely covering the caudex, the smaller leaves often sessile on the dilated portion of the petiole; flowering stalks straw-like, solitary or several together, 1–2.5 dm. tall, more or less densely glandular-pubescent, the upper leaves remote and increasingly bract-like; inflorescence paniculate, the cymes rather distant; sepals ovate-lanceolate, reflexed, ciliate, 1.5–2 mm. long; hypanthium about as long, campanulate; petals elliptic-spatulate to elliptic, apiculate to acute, narrowed to a distinct claw, persistent and reflexed, 2–3 mm. long; ovary about half inferior, in fruit mostly 4–5 mm. long.

Dry cliffs, Arid Transition and Canadian Zones; higher Inner Coast Ranges of extreme northern California and adjacent Oregon. Type locality: "High mountains west of Mt. Shasta." California. July.

7. *Saxifraga oppositifolia* L. Purple Saxifrage. Fig. 2242.

Saxifraga oppositifolia L. Sp. Pl. 402. 1753.

Antiphylla oppositifolia Fourr. Ann. Soc. Linn. Lyons II, 16: 386. 1868.

Caulescent perennial forming low dense mats; branches erect, at least distally, 2.5–5 dm. high, slender and somewhat suffrutescent, densely clothed (except at the base and often save on the flowering stems and a few elongated stems) with imbricated decussate leaves, the stem thus appearing 4-cornered. Leaf-blades sessile, broadly ovate to obovate, often slightly acuminate, keeled, ciliate, somewhat thick and cartilaginous, pale green and soon turning purple-brown, 3–5 mm. long, the uppermost sometimes spatulate to oblong; flowers solitary at the branch-tips; sepals oblong, obtuse, ciliate, 2.5–3.5 mm. long, at least 3 times as long as the hypanthium; petals persistent, purple, fading to lilac, prominently veined, oval to orbicular-ovate, stoutly and abruptly clawed, 5–8 mm. long; filaments subulate to triangular-subulate, purple, about half as long as the petals; follicles adnate to the hypanthium only toward their very bases; styles purplish, at anthesis but slightly spreading.

In cliff-crevices, Boreal Zones; circumboreal, in Pacific North America extending southward in the Rocky Mountains to Wyoming, coastally to the Olympic Mountains and Mount Rainier, Washington, and in the Wallowa Mountains of eastern Oregon. Type locality: "in rupibus Alpium Spitzbergenisium, Lapponicarum, Pyrenaeicarum, Helveticarum." June–Aug.

8. *Saxifraga Lyallii* Engler. Red-stemmed Saxifrage. Fig. 2243.

Saxifraga Lyallii Engler, Verh. Zool.-Bot. Ges. Wien 19: 582. 1869.

Saxifraga Lyallii laxa Engler, loc. cit.

Saxifraga punctata var. *acutidentata* Engler, op. cit. 19: 548.

Acaulescent from a perennial caudex. Leaf-blades obovate-cuneate, often quite truncate at the tip, sharply and coarsely serrate-dentate, usually only above the middle (or flabellate, crenate-dentate with gland-tipped teeth except at the widely truncatish base), glabrous, 1–4.5 cm. long, the petioles gradually dilated above, gradually to abruptly merging with the blade, 0.5–9 cm. long; scapes 0.8–3 dm. high, often purplish; glabrous; inflorescence relatively short, the few primary branches ultimately virgate-ascending, glabrous or sparingly glandular; cymules open, usually reduced to solitary flowers, these often "double"; sepals soon reflexed, oblong-ovate, mostly glabrous; petals white, the 2 greenish spots at the base soon fading, broadly oval to elliptic, 2–4 mm. long, the short broad claw distinct; filaments broadened upward; follicles normally 2, more often 3–5, strikingly (7–12 mm.) long when mature, erect, the very short styles often widely divergent to recurved.

Rocky ledges, Boreal Zones; southeastern Alaska to northern Idaho and western Montana and the northern Cascade Mountains of northern Washington. Type locality: "Fort Colville," northeastern Washington. July–Aug. The type locality is possibly an error, for this species has not since been collected in its general region.

9. *Saxifraga arguta* D. Don. Brook Saxifrage. Fig. 2244.

Saxifraga arguta D. Don, Trans. Linn. Soc. 13: 356. 1822.

Saxifraga punctata of American authors generally, not L.

Saxifraga odontophylla Piper, Contr. U.S. Nat. Herb. 11: 314. 1906. Not Wall. 1834.

Saxifraga odontoloma Piper, Smiths. Misc. Coll. 50: 200. 1907.

Acaulescent mostly glabrous perennial from a horizontal rhizome. Leaves erect or ascending, the blades suborbicular to orbicular-reniform, 2–8 cm. wide, coarsely and more or less evenly crenate-dentate with gland-tipped teeth, deeply cordate at the base, usually glabrous, mostly much shorter than the petioles, these slender, glabrous, 4–20 cm. long; scapes 14–16 cm. tall, glabrous below the inflorescence, more or less glandular above; inflorescence broadly paniculate, the cymules spreading and relatively few-flowered, the peduncles and pedicels often purplish, minutely glandular-pubescent, elongating in age; sepals lanceolate to oblong, 1.5–2 mm. long, usually glabrous, well reflexed, commonly purple; petals suborbicular to elliptic-obovate, 2.5–3.5 mm. long, white with 2 or 3 greenish-yellow dots toward the base, the abrupt claws distinct, short and slender; filaments broadened upward, more or less petaloid; anthers roundish, purple; capsule 4–8 mm. high, urceolate, erect, purple or at least purple-veined, the spreading or recurved tips comparatively short.

Along high mountain streams, Boreal Zones; British Columbia eastward to Montana and southward in the Cascade and Rocky Mountains to southern California, Arizona, and New Mexico. Type locality: coast of northwestern North America. July–Aug.

10. *Saxifraga aestivalis* Fisch. & Mey. Summer Saxifrage. Fig. 2245.

Saxifraga aestivalis Fisch. & Mey. Ind. Sem. Hort. Petrop. 1: 37. 1835.

Saxifraga paddoensis Suksdorf, W. Amer. Sci. 15: 59. 1906.

Habit very much like that of the preceding but the whole plant smaller. Leaves erect or ascending, the blades suborbicular to reniform, 2–5 cm. wide, coarsely few-toothed with crenate or narrower, sometimes overlapping, gland-tipped teeth, or sometimes almost crenately lobed, cordate at the base, glabrous, much shorter than the petioles, these slender, mostly glabrous, 3–10 cm. long; scapes often more or less glandular-pubescent, especially above, 7–24 cm. tall; inflorescence much less diffuse than in the preceding species, somewhat corymbosely branched, usually glandular-pubescent; cymules open, mostly ascending, the peduncles and pedicels elongated, more pubescent than the scapes; sepals oblong-ovate, 0.8–1.5 mm. long, reflexed; petals white, 2–3.5 mm. long, the elliptic, ovate or mostly oblong blades gradually narrowed into short claws; filaments broadened upward, more or less petaloid; capsule slender, at maturity 4–6 mm. long, the bodies erect, their upper third to half divergent, more or less abruptly reflexed at the tips, dark purple.

Shaded stream banks, Hudsonian and Arctic-Alpine Zones; Alaska and the adjacent islands to Alberta and northern Oregon; also in northeastern Siberia. Type locality: not given. June–Aug.

11. *Saxifraga Mertensiana* Bong. Wood Saxifrage. Fig. 2246.

Saxifraga Mertensiana Bong. Mém. Acad. St.-Petersb. VI. 2: 141. 1832.

Saxifraga heterantha Hook. Fl. Bor. Amer. 1: 252. 1832.

Heterisia Eastwoodiae Small, N. Amer. Fl. 22: 156. 1905.

Perennial herb from an erect scaly bulb-like usually bulbiferous rootstock. Leaf-blades rather fleshy but thin in the dried specimen, suborbicular to ovate-reniform, with many shallow and commonly 3-toothed lobes, shallowly to deeply cordate at the base, 2–7 cm. wide, glabrous or sparingly pubescent; petioles 3–14 cm. long, glabrous or hirsutulous; stipules wing-like, scarious, often closely imbricated; flower-stalks 10–30 cm. tall, more usually pubescent and minutely glandular, paniculately branched above, bearing 1 or 2 leaves toward the base, bractlet-bearing above, at least at the inflorescence; cymules few-flowered, frequently all but the terminal flower reduced to bulblets, the pedicels abruptly recurved after anthesis; calyx cleft almost to the very base, the sepals oblong to oblong-ovate, 1.5–2.5 mm. long, usually glabrous, reflexed; petals white, 3–5 mm. long, ovate or elliptic above the short claws; filaments white, broadened above, more or less petaloid; anthers orbicular-reniform; ovary almost entirely superior, the

carpels at first united for almost their full lengths, the beaks at length as long as the body and divergent, the tips often recurved.

Damp woods, mostly Canadian Zone; southeastern Alaska southward along the coast to Sonoma County, and sparingly in the Sierra Nevada to Mariposa County, California, inland to northern Idaho and the Blue Mountains of eastern Oregon. Type locality: Sitka, Alaska. March-July.

12. *Saxifraga Sibthorpii* Boiss. Yellow Saxifrage. Fig. 2247.

Saxifraga Sibthorpii Boiss. Diag. Pl. Or. I. 3: 22. 1843.

Delicate flaccid glabrous caulescent and caespitose annual or biennial 8-20 cm. tall. Basal leaf-blades reniform, crenately lobed, 10-15 mm. wide, the lower on long slender petioles, the upper sometimes sessile and rhombic-ovate; inflorescence terminal, loosely paniculate, single flowers sometimes arising from the lower leaf-axils; hypanthium flattish, poorly developed; sepals triangular-ovate, 1-2 mm. long, longer than the hypanthium, reflexed even at anthesis; petals yellow, 4 mm. long, elliptic with a short inconspicuous claw; filaments narrowly subulate; fruiting carpels green, coalesced for three-fourths of their lengths, more or less truncate at the top, the styles short, their tips ultimately divergent.

Moist rocky slopes, Humid Transition Zone; adventive about Portland, Oregon (Elk Rock). A native of Greece. June.

13. *Saxifraga Tolmiei* Torr. & Gray. Alpine Saxifrage. Fig. 2248.

Saxifraga Tolmiei Torr. & Gray, Fl. N. Amer. 1: 567. 1840.

Saxifraga ledifolia Greene, Pittonia 2: 101. 1890.

Densely tufted perennial with short and branched, leafy, more or less prostrate stems and erect, mostly leafless flower-stalks from a slender woody caudex, usually forming mats. Leaves subsessile, glabrous, thickish, often slightly revolute, more or less crowded, oblong-lanceolate, 8-15 mm. long, or sometimes oval to oblong, obtuse, often semi-terete, 2-9 mm. long; flower-stalks 3-12 cm. tall, sparingly to densely, but finely, glandular-pubescent, especially above, leafless or bearing 1 or 2 reduced leaves, terminating in a narrow panicle- to corymb-like cyme, less often, in the smallest plants, 1-flowered; sepals ovate, 2-2.5 mm. long, glabrous, obtuse; petals white, elliptic to spatulate, 4-5.5 mm. long; filaments dilated below the summit; capsules 8-12 mm. long.

Rocky soil, Boreal Zones; southern Alaska southward through Washington and Oregon and in the Sierra Nevada to Tulare County, California. Type locality: "North West Coast" of North America. July-Aug. The typical form, with shorter leaves and the flowers few and sometimes solitary, is not found south of Washington.

14. *Saxifraga bronchialis* subsp. *austromontana* (Wiegand) Piper. Spotted Saxifrage. Fig. 2249.

Saxifraga bronchialis Pursh, Fl. Amer. Sept. 310. 1814. Not L.

Saxifraga austromontana Wiegand, Bull. Torrey Club 27: 389. 1900.

Saxifraga cognata E. Nels. Bot. Gaz. 30: 118. 1900.

Saxifraga bronchialis austromontana Piper, Contr. U.S. Nat. Herb. 11: 313. 1906.

Perennial mostly matted herb with copiously leafy, more or less horizontally creeping caudices and offshoots terminated by less leafy erect flowering stalks. Caudical leaves subulate or narrowly lanceolate, parchment-like, crowded and more or less spreading, or often somewhat imbricated, spinulose-ciliate almost to the mostly acuminate and cuspidate apex, 5-16 (mostly 10-12) mm. long; flower-stalks glabrate to sparingly glandular-pubescent, 6-15 cm. tall, terminating in a compact or elongated cyme and bearing several remote leaves smaller than the caudical ones; sepals ovate and obtuse to ovate-lanceolate, glabrous or sparingly ciliate, 1.5-3 mm. long, much longer than the hypanthium; petals white, veined and often spotted with maroon, oblong to oblong-lanceolate, 4-6 mm. long, clawless; filaments subulate; capsule 5-9 mm. long.

Among rocks, Boreal Zones; British Columbia and Alberta to Oregon and New Mexico. Type locality: Cascade Mountains of Washington. July-Aug.

Saxifraga bronchialis var. *vespertina* (Small) Rosend. Bot. Jahrb. 37. Beibl. 83: 73. 1905. (*Leptasea vespertina* Small, N. Amer. Fl. 22: 153. 1905.) Differs from *S. bronchialis* subsp. *austromontana* in having the caudical leaves oblong-spatulate to oblanceolate and the petals often oval to oval-elliptic and more or less obtuse. Rocky cliffs, Humid Transition Zone; coastal Alaska to the Columbia River Gorge, Oregon. Type locality: Baldy Peak, Chehalis County, Washington.

15. *Saxifraga ferruginea* Graham. Alaska Saxifrage. Fig. 2250.

Saxifraga ferruginea Graham, Edinb. New Phil. Journ. 1828: 349. 1829.

Saxifraga nothana Moc. ex Ser. in DC. Prod. 4: 40, as synonym. 1830.

Saxifraga Bongardii Presl in Engler, Verh. Zool.-Bot. Ges. Wien 19: 528. 1868.

Saxifraga ferruginea var. *Macounii* Engler & Irmsch. Pflanzenreich 4117: 70. 1916.

Saxifraga ferruginea var. *nivea* A. M. Johnson, Minn. Stud. Biol. Sci. 4: 64. 1923.

More or less glandular-pubescent herb 1-4 dm. tall. Leaves mostly basal, crowded on a short caudex, spatulate to oblanceolate-spatulate, 2-8 cm. long, sharply and sometimes broadly toothed mostly above the middle, more or less pubescent; flowering stems solitary or several, rather widely paniculate, the branches ascending; bracts often reddish, usually much smaller than the leaves, the lower often foliaceous, sometimes 4 cm. long; lateral pedicels often bearing clusters of bulblets; sepals oblong-ovate, 1-2.5 mm. long, reflexed; petals unequal, oblong-lanceolate to spatulate-elliptic, 3.5-5 mm. long, white with 2 yellow spots at the base; carpels united for two-thirds of their lengths, the style-tips divergent.

Along alpine rills, Boreal Zones; Alaska southward through British Columbia and the Canadian Rocky Mountains to northern Idaho and Montana, and through Washington and Oregon to the Siskiyou and Salmon Mountains of northwestern California. Type locality: not definitely stated; first described from plants raised from seed in the Edinburgh Botanic Garden. July-Aug.

16. *Saxifraga bryophora* A. Gray. Bud Saxifrage. Fig. 2251.

Saxifraga bryophora A. Gray, Proc. Amer. Acad. 6: 533. 1865.

Saxifraga leucanthemifolia var. *integrifolia* Engler, Verh. Zool.-Bot. Ges. Wien 19: 528. 1869.

Spatularia bryophora Small, N. Amer. Fl. 22: 148. 1905.

Acaulescent annual producing a cluster of small fusiform roots from a slender caudex, glandular-pubescent throughout. Leaves crowded about the base of the scape, linear-elliptic to oblong-ob lanceolate, 0.5–3 cm. long, entire, very rarely shallowly toothed toward the acute apex; scapes one to several, 0.5–2 dm. tall, becoming more or less divaricately branched above; pedicels filiform, usually all but the terminal soon deflexed and bearing conspicuous bulblets; terminal flower as well as the bulblets subtended by minute greenish or reddish bracts 1–3 mm. long; sepals ovate, 1.5–2.5 mm. long, usually reflexed; petals elliptic to ovate-oblong, 2–3 mm. long, white with 2 yellowish spots at the base, almost regular to more usually unequal, the 3 larger abruptly clawed; capsule 3–4 mm. long, the extremely short styles divergent.

In moist gravelly soil, Boreal Zones; Sierra Nevada from Plumas County to Tulare County, California. Type locality: Ebbett's Pass, California. July–Aug.

17. *Saxifraga aprica* Greene. Sierra Saxifrage. Fig. 2252.

Saxifraga nivalis of Calif. authors, not L.

Saxifraga umbellulata Greene, Erythra 1: 222. 1893. Not Hook. & Thoms. 1857.

Saxifraga aprica Greene, Bull. Torrey Club 23: 25. 1896.

Micranthes aprica Small, N. Amer. Fl. 22: 135. 1905.

Acaulescent from a perennial fibrous-rooted caudex often beset with numerous bulblets. Leaves 1–5 cm. long, the blades ovate to spatulate or oblong, undulate, sinuate-crenate to shallowly crenulate or crenate-dentate, green above, often purplish beneath, cuneately or more abruptly narrowed into the often broadly winged petioles; scapes solitary, less usually paired, slender, purplish to reddish, only sparingly and very inconspicuously glandular-pubescent below, 5–18 cm. tall; cymules mainly or wholly aggregated into a terminal head- or umbel-like cluster, the peduncles and pedicels very short, non-glandular, glabrous; sepals ovate or often very much broader, 1–1.5 mm. long; petals obovate to oblong-obovate, 1.5–2 mm. long, longer than the sepals, narrowed to a claw-like base; filaments subulate; capsule 2.5–4 mm. long, purple.

Wet or recently moist gravelly soil, Boreal Zones chiefly; mountains of northern Trinity County eastward to Mount Shasta and southward in the Sierra Nevada to Tulare County, California. Also in the mountains of adjacent Oregon and Nevada. Type locality: "Near Donner Lake," California. May–Aug.

18. *Saxifraga columbiæna* Piper. Piper's Saxifrage. Fig. 2253.

Saxifraga columbiana Piper, Bull. Torrey Club 27: 393. 1900.

Saxifraga apetala Piper, loc. cit.

Saxifraga chelanensis A. M. Johnson, Amer. Journ. Bot. 21: 109. 1934.

Acaulescent perennial herb from a relatively stoutish, fibrous-rooted caudex. Leaves thin-nish, 2–10 cm. long, the blades ovate to oblong or elliptic, shallowly undulate and denticulate or remotely serrate with gland-tipped teeth, glabrous or only sparingly pubescent, gradually to abruptly narrowed into petioles usually shorter than the blades; scapes often stout, 1–3.5 dm. tall, rather copiously and evenly glandular-pubescent; cymules permanently contracted, forming a narrowly pyramidal or cylindric cyme, the lower peduncles becoming somewhat lengthened; hypanthium often enclosed in a filmy envelope (possibly of teratological origin); sepals triangular-oblong, 2–2.5 mm. long; petals oblong to cuneate, shorter than, though sometimes equaling the sepals, often greenish, sometimes lacking; filaments subulate, about as long as the petals; capsule stoutish, 4.5 mm. high, merely the tips divergent.

Moist hillsides and rocky slopes, Arid Transition Zone; from the eastern base of the Cascade Mountains of Washington eastward to Montana and south to adjacent Oregon. Type locality: Pullman, Washington. April–June. Erroneously referred to *S. nidifica* by St. John, Flora of Southeastern Washington.

Saxifraga plantaginæa Small, Bull. Torrey Club 23: 366. 1896. Acaulescent from a thick caudex; leaves drying leathery, oval to rhombic, varying to oblong, often rufous-hairy beneath; hypanthium often enclosed in a filmy envelope; petals broadly obovate, usually shorter than the sepals. Mountains of eastern Washington and adjacent Idaho. Type locality: "Spokane," Washington.

19. *Saxifraga nidifica* Greene. Peak Saxifrage. Fig. 2254.

Saxifraga nidifica Greene, Erythra 1: 222. 1893.

Acaulescent, often diminutive perennial from a caudex densely beset with bulblet-like offshoots. Leaves broadly ovate to narrowly elliptic, 1–4 cm. long, sparingly repand-denticulate to almost entire, glabrous or very rarely glandular-hirsutulous, pale green or purplish-tinged, more or less abruptly narrowed to slightly winged petioles often longer than the blades; scapes slender, 1–3 dm. tall, glandular-pubescent quite or almost to the ultimate pedicels; bracts oblong-linear, much shorter than the peduncles; hypanthium glabrous; sepals ovate to oblong, obtuse, 1.5–1.8 mm. long, glabrous, ultimately reflexed; petals white, oval-orbicular to more usually spatulate-elliptic, mostly sessile, varying from slightly shorter than to slightly longer than the sepals; filaments short, narrowly triangular.

Meadows and bogs, mostly Boreal Zones; Sierra Nevada of California, from Tulare County northward to Siskiyou County, westward to Trinity and Humboldt Counties, and northeastward to the mountains of eastern Oregon. Type locality: above Donner Lake, Placer County, California. June–Aug.

20. *Saxifraga oregana* Howell. Bog Saxifrage. Fig. 2255.

Saxifraga integrifolia var. *sierrae* Coville, Proc. Biol. Soc. Wash. 7: 78. 1892.

Saxifraga oregana Howell, Erythea 3: 34. 1895.

Saxifraga sierrae Small, Bull. Torrey Club 23: 366. 1905.

Saxifraga oregana var. *sierrae* Engler & Irmsch. Pflanzenreich 4¹¹⁷: 63. 1916.

Robust acaulescent herb from a stout often creeping perennial rootstock. Leaves 5–15 (often longer) cm. long, the blades oblong-spatulate, elliptic or ovate-elliptic (greatly elongated and broadly linear to linear-spatulate on plants growing in water), remotely glandular-denticulate to coarsely glandular-serrate, typically glabrous, though sometimes sparingly pubescent and ciliolate, gradually narrowed to a broadish, margined, sheathing base; scapes stout, typically solitary, erect, 3–9 dm. tall, uniformly glandular-pubescent, widely paniculate to narrowly thyrsoid and often densely glandular-puberulent above; cymules aggregated into clusters terminating the ascending peduncles, these subtended by conspicuous linear-lanceolate bracts often 1 cm. long; sepals ovate or broader, ultimately reflexed, 2–2.5 mm. long; petals white, elliptic to obovate, sessile by a short broad base, 2–4 mm. long; filaments subulate; capsule 3.5–5 mm. long, green to purple, the short beaks spreading.

Meadows and bogs, Transition and Boreal Zones; western Washington southward to the higher North Coast Ranges and the Sierra Nevada (to Tulare County) of California, eastward to northern Idaho and southwestward to the mountains of eastern and central Oregon and westernmost Nevada. Type locality: "Mountain marshes of Oregon and Washington." April–Aug.

21. *Saxifraga integrifolia* Hook. Hooker's Saxifrage. Fig. 2256.

Saxifraga integrifolia Hook. Fl. Bor. Amer. 1: 249. 1832.

Saxifraga bracteosa Suskendorf, Deutsch. Bot. Monatss. 18: 27. 1900.

Saxifraga bracteosa var. *angustifolia* Suskendorf, loc. cit.

Acaulescent glandular-hirsutulous perennial herb from a stoutish fibrous-rooted rootstock. Leaves 1–6 cm. long, the blades almost subcoriaceous, ovate-elliptic to oblong-elliptic, entire or rarely slightly sinuate-crenate, shortly and densely viscid-hirsutulous, especially on the upper surface, more or less abruptly contracted into winged petioles mostly shorter than the blades; scape more or less rigid, not slender, scabrid, 2–4 dm. tall; inflorescence relatively narrow, the cymules even in fruit more or less contracted, only one or two of the lower long-pedunculate; sepals triangular-oblong, obtuse to acutish, about 1.5 mm. long, ultimately reflexed; petals white, spatulate-elliptic, blunt at the practically clawless base, about 2.5 mm. long; filaments subulate; follicles depressed, very broad, even in fruit.

Borders of meadows and in gravelly prairies, Humid Transition Zone; western Washington and northwest Oregon, extending more sparingly eastward along the Columbia River to central and eastern Washington and adjacent Oregon. Type locality: near the mouth of the Columbia River. Originally collected by Scouler. March–July.

22. *Saxifraga fragosa* Suksdorf. Fleshy-leaved Saxifrage. Fig. 2257.

Saxifraga fragosa Suksdorf ex Small, Bull. Torrey Club 23: 363. 1896.

Saxifraga integrifolia var. *fragosa* Rosend. Bot. Jahrb. 37. Beibl. 83: 68. 1905.

Saxifraga laevicarpa A. M. Johnson, Minn. Stud. Biol. Sci. 4: 46. 1923.

Saxifraga cephalantha Heller ex Engler & Irmsch. Pflanzenreich 4¹¹⁷: 59, as a synonym. 1916.

Acaulescent perennial from a relatively slender caudex. Leaves relatively thickish and fleshy, glabrous or seldom sparsely pubescent on both surfaces, often reddish and glaucous, entire or slightly repand or rarely repand-denticulate, deltoid-ovate to ovate-oblong, 3–5 cm. long, usually abruptly contracted into petioles mostly as long as to longer than the blades; scapes 2–4 dm. tall, thickish, relatively fleshy, usually reddish, densely glandular-puberulent, corymbosely branched above, the cymules often opening tardily; peduncles and pedicels very glandular, often conspicuously bracteate; hypanthium glabrate to glabrous, the glabrous sepals broadly oblong, obtuse to acutish, 1.5 mm. long; petals rhombic-ovate to oval, sessile by a broad claw-like base, 2.5–3.5 mm. long; filaments subulate at anthesis, uniformly wider before; fruiting follicles purple, conical, the tips recurving.

Wet rocks and moist ground, Humid Transition and Canadian Zones; Washington and northeastern Oregon southward in the Coast Ranges to Lake and Sonoma Counties, California. Type locality: western Klickitat County, Washington. March–July.

Saxifraga fragosa subsp. *claytoniaefolia* (Canby) Bacigalupi. (*S. claytoniaefolia* Canby ex Small, Bull. Torrey Club 23: 365. 1896.) Differs mostly in having longer and wider deltoid-ovate leaves 4–7 cm. long. Washington and northern and northeastern Oregon. Type locality: The Dalles, Oregon.

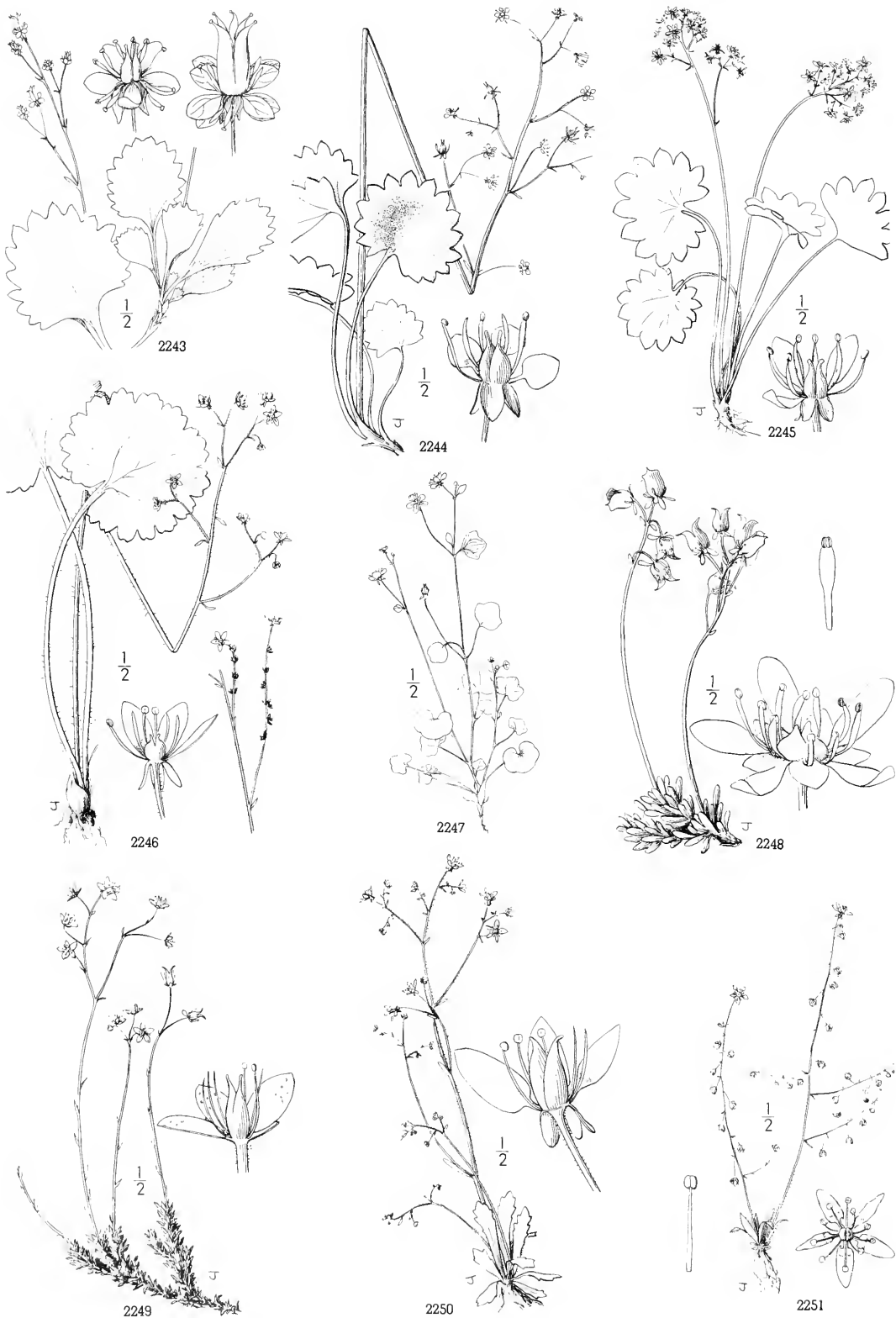
23. *Saxifraga Howellii* Greene. Howell's Saxifrage. Fig. 2258.

Saxifraga Howellii Greene, Pittonia 2: 163. 1897.

Micranthes Howellii Small, N. Amer. Fl. 22: 140. 1905.

Diminutive acaulescent plant from a perennial caudex. Leaves 1.5–4 cm. long, the blades relatively thin, cuneate or oblong-cuneate, coarsely crenate or serrate-dentate, ciliolate, the lower surface of young leaves with a loose rusty arachnoid pubescence, soon becoming glabrous, narrowed into slender petioles usually longer than the blades; scapes solitary or paired, 6–15 cm. tall, glabrous save for the loosely rusty-pubescent base, corymbose and bracteate above; cymules few-flowered, open, the peduncles and pedicels very slender; sepals oblong to ovate-oblong, about 1.5 mm. long, glabrous, reflexed; petals white, oblong, 2.5–3 mm. long, clawless; filaments narrowly subulate, almost as long as the petals; carpels 2.5–3 mm. long, green to dark purplish.

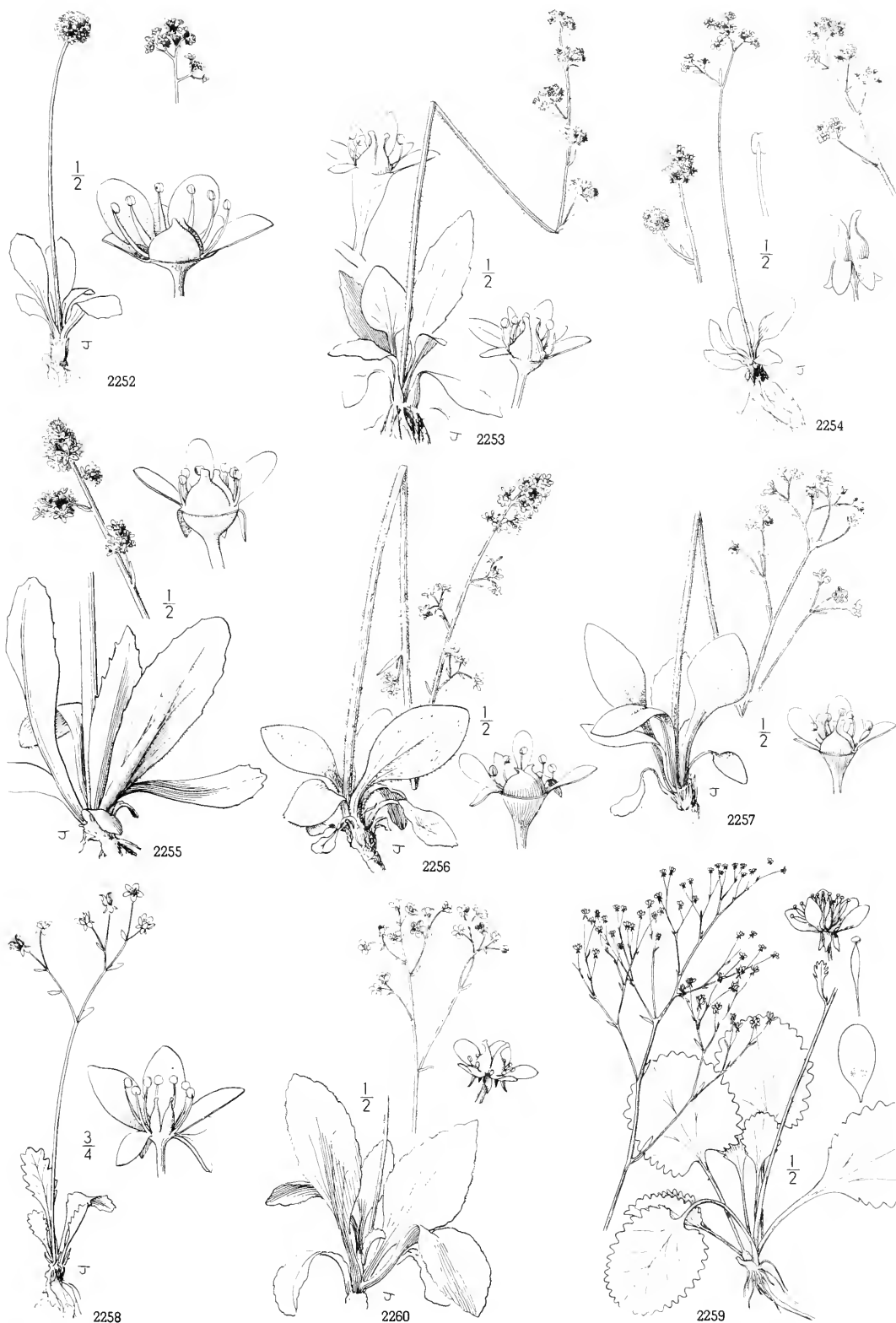
Recently wet places, Humid and Arid Transition Zones; southwestern Oregon and adjacent California. Apparently very local. Type locality: "On the Coquell [Coquille] River, Oregon." March–May.



2243. *Saxifraga Lyallii*
2244. *Saxifraga arguta*
2245. *Saxifraga aestivalis*

2246. *Saxifraga Mertensiana*
2247. *Saxifraga Sibthorpii*
2248. *Saxifraga Tolmiei*

2249. *Saxifraga bronchialis*
2250. *Saxifraga ferruginea*
2251. *Saxifraga bryophora*



2252. *Saxifraga aprica*
 2253. *Saxifraga columbiana*
 2254. *Saxifraga nidifica*

2255. *Saxifraga oregana*
 2256. *Saxifraga integrifolia*
 2257. *Saxifraga fragosa*

2258. *Saxifraga Howellii*
 2259. *Saxifraga Marshallii*
 2260. *Saxifraga californica*

24. *Saxifraga Marshallii* Greene. Marshall's Saxifrage. Fig. 2259.

Saxifraga Marshallii Greene, Pittonia 1: 159. 1888.

Saxifraga petiolata A. M. Johnson, Minn. Stud. Biol. Sci. 4: 29. 1923.

Saxifraga Hallii A. M. Johnson, op. cit. 4: 24. 1923.

Acaulescent perennial from a fibrous-rooted caudex. Leaves thickish, 4–9 cm. long, the blades oblong to oblong-orbicular, cuneate to subcordate at the base, coarsely dentate, crenate or crenate-dentate, reddish-pubescent beneath, essentially glabrous and bright green above, commonly shorter than the petioles; scapes 12–30 cm. tall, thinly glandular-puberulent, corymbosely branched above; cymules open, the peduncles and pedicels elongated, pubescent; sepals ovate to oblong-ovate, 1.5–2.5 mm. long, reflexed; petals white with 2 greenish to yellow spots below the middle, 2.5–3.5 mm. long, oval to oblong, often somewhat cuneate below; filaments broadened upward, often markedly petaloid; carpels 2.5 mm. long, the slender tips spreading.

Moist bluffs and meadows, Transition and Boreal Zones; northern Idaho and Washington to Humboldt County, California. Type locality: "Supply Creek, w. of Hupa Valley, at considerable altitude . . . , Humboldt Co.," according to Jepson, rather than "Hupa Valley," as stated by Greene. May–June. This is the *Saxifraga odontoloma* of Gilkey's Handbook of Northwest Flowering Plants.

Saxifraga idahoensis Piper, Bull. Torrey Club 27: 394. 1900. (*S. Marshallii* var. *idahoensis* Engler & Irmsch. Pflanzenreich 4117: 37. 1916.) A species with petaloid filaments and reflexed sepals close to *S. Marshallii* but the flowers much smaller (petals 1.5–2 mm. or 2.5 mm. long) and wholly white, without colored spots. Northern Idaho and adjacent Washington. Type locality: Kendrick, Idaho.

25. *Saxifraga californica* Greene. California Saxifrage. Fig. 2260.

Saxifraga virginensis Benth. Pl. Hartw. 311. 1848. Not Michx.

Saxifraga californica Greene, Pittonia 1: 286. 1889.

Saxifraga virginensis var. *californica* Jepson, Fl. W. Mid. Calif. 268. 1901.

Saxifraga napensis Small, Bull. Torrey Club 25: 316. 1898.

Acaulescent perennial herb from a short erect fibrous-rooted caudex. Leaves 3–12 (typically about 6) cm. long, mostly ascending, obovate-oblong to elliptic, sinuately crenate-dentate to denticulate, usually more or less sparsely pilose above, often with gland-tipped hairs, pilose-ciliate, paler beneath, abruptly to gradually narrowed into narrowly winged petioles varying from 5–50 mm. in length; scapes 15–30 cm. tall, thinly glandular-pubescent, especially above, green or purplish, loosely branched above; cymules becoming open; sepals ovate, soon reflexed, 1.5–2 mm. long, often reddish or purplish; petals white, oval to obovate, sessile, 3.5–5 mm. long; filaments subulate, as long as to longer than the sepals; capsule 2.5–3.5 mm. long, purple or purple-tinged, the carpels coalesced only at the base.

Shaded rocky places, mostly on the lower hills, Upper Sonoran Zone for the most part; southwestern Oregon southward in the Coast Ranges and along the foothills of the western slope of the Sierra Nevada to the San Bernardino, San Gabriel, and Santa Monica mountains, California. Also on the Channel Islands. Type locality: "Central parts of California, in the Coast Range especially." Feb.–June.

Saxifraga montana (Small) Fedde, Bot. Jahresb. 331: 613. 1906. (*Micranthes montana* Small, N. Amer. Fl. 22: 138. 1905; *Saxifraga californica* var. *nidifica* Engler & Irmsch. Pflanzenreich 4117: 44. 1916; *Saxifraga fallax* Jepson, Fl. Calif. 2: 120. 1936. Not Greene.) Differs from *S. californica* in having the leaves (even the upper surfaces) glabrous, the petioles often shorter, the floral bracts much longer and the portion of the mature carpels below the beaks much more depressed. The inflorescence-branches soon become very lax and elongated. Meadows mostly Canadian and Hudsonian Zones; Sierra Nevada, Butte County to Tulare County, California. Type locality: Pyramid Peak, Eldorado County, California. Occupies a zonal belt more or less coextensive with that of *S. nidifica*, high above that of *S. californica*.

26. *Saxifraga fallax* Greene. Greene's Saxifrage. Fig. 2261.

Saxifraga fallax Greene, Bull. Torrey Club 23: 25. 1896.

Saxifraga gracillima A. M. Johnson, Minn. Stud. Biol. Sci. 4: 45. 1923.

Acaulescent, sparsely glandular, from a perennial caudex. Leaf-blades very thin, only sparingly pubescent to glabrate, ovate to oval, coarsely toothed to repand, subcordate to subtruncate at the base, the petioles relatively slender, as long as to mostly longer than the blades; scape 1.5–3 dm. high, the cyme very loose, the pedicels very slender and mostly much longer than the flowers; hypanthium broadly turbinate, glabrous, about as long as the triangular-oblong permanently erect sepals; petals obovate-oblong to mostly narrowly oblong, spatulately narrowed to a claw-like base, about 4 mm. long, $2\frac{1}{2}$ to 4 times as long as the sepals.

Rocky places, Upper Sonoran and Transition Zones; southern Oregon to Sonoma and Amador Counties, California. Type locality: "Lassen's Peak" and "above Donner Lake," California. Feb.–June.

Saxifraga parvifolia Greene, Pittonia 3: 116. 1896. (*S. laevicaulis* A. M. Johnson, Minn. Stud. Biol. Sci. 4: 26. 1923.) Much closer to *S. californica* than the last. It is distinguished by its very small widely ovate glabrous leaves 1–2 cm. long, very slender petioles somewhat longer than the blades, very tardily and not totally reflexed sepals and white petals only 2 to $2\frac{1}{2}$ times as long as the sepals. Apparently local in southwestern Oregon. Type locality: Grant's Pass, Oregon.

27. *Saxifraga occidentalis* subsp. *rufidula* (Small) Bacigalupi. Rusty Saxifrage. Fig. 2262.

Micranthes rufidula Small, N. Amer. Fl. 22: 140. 1905.

Saxifraga rufidula Macoun, Ottawa Nat. 20: 162. 1906.

Micranthes Allenii Small, op. cit. 22: 144. 1905.

Micranthes acquidentata Small, op. cit. 22: 145. 1905.

Saxifraga klickitatensis A. M. Johnson, Minn. Stud. Biol. Sci. 4: 25. 1923.

Acaulescent perennial. Leaves 1–4 cm. long, often almost subcoriaceous, oblong to ovate, coarsely crenate, bright greenish and essentially glabrous above, especially the younger leaves

densely rusty-tomentose beneath; petioles usually shorter than the blades, usually less than 2 mm., though sometimes as much as 5 mm., wide; scapes 5–20 cm. tall, somewhat purplish, densely pubescent below, the pubescence often rusty-tomentose, glabrous or merely inconspicuously pubescent to densely glandular above, corymbosely branched; cymules at length open; peduncles and pedicels often purplish, puberulent with or without gland-tipped hairs, or glabrate; sepals oblong-ovate, 2–2.5 mm. long, glabrous, obtuse; petals white, 2.5–4 mm. long, elliptic to broadly oval, shortly clawed; filaments usually subulate, sometimes broadened upward and petaloid, both kinds rarely in a single flower; carpels 3–4 mm. long, deep purple, with widely spreading tips.

Rocky crevices, Boreal Zones in the mountains and Humid Transition Zone in the Columbia River Gorge region; southern British Columbia southward to the upper reaches of the Willamette Valley, Oregon. Type locality: Mount Finlayson, Vancouver Island, British Columbia. March–July.

Saxifraga occidentalis S. Wats. Proc. Amer. Acad. 23: 264. 1888. (*Saxifraga saximontana* E. Nels. Erythea 7: 168. 1899.) May be distinguished from *Saxifraga occidentalis* subsp. *rufidula* most easily by its unmistakably petaloid filaments, its usually curved scape, its often much more saliently toothed leaves, and the usually totally green (not reddish) hue of its herbage. Mountain slopes, Boreal Zones; Alberta to Montana and westward to the northeastern corner (Okanogan County to Spokane County) of Washington. Type locality: "Rocky Mountains."

10. CHRYSOSPLENĪUM [Tourn.] L. Sp. Pl. 398. 1753.

Low, somewhat succulent, dichotomously branched herbs, mainly semi-aquatic and with perennial rootstocks. Leaves petiolate, crenate, opposite or alternate, exstipulate. Flowers greenish, small, axillary or terminal, solitary or in small corymbs, perfect. Hypanthium saucer-shaped or campanulate, adnate to the lower portion of the ovary and usually lined with an epigynous disk. Sepals normally 4. Petals none. Stamens 4–8 (rarely 10), inserted on the margin of the disk; filaments short. Ovary 1-celled, flattish, 2-lobed; styles 2, recurved, usually short; placentae parietal, many-ovuled. Capsule membranous, short, inversely cordate or 2-lobed, 2-valved above, few- or many-seeded. Seed coat muricate or pilose. [Name Greek, meaning golden spleen, from some reputed medicinal quality.]

A genus of about 15 species, natives of the north temperate zone and of southern South America. Type species, *Chrysosplenium oppositifolium* L.

Lower leaves always opposite (the upper sometimes alternate); flowers solitary, axillary; stamens 8.

Leaves all alternate; flowers clustered in the upper leaf-axils; stamens 4.

1. *C. glechomaefolium*.

2. *C. tetrandrum*.

1. *Chrysosplenium glechomaefolium* Nutt. Pacific Water Carpet. Fig. 2263.

Chrysosplenium glechomaefolium Nutt. in Torr. & Gray, Fl. N. Amer. 1: 589. 1840.

Chrysosplenium oppositifolium var. *Scouleri* Hook. Fl. Bor. Amer. 1: 242. 1832.

Chrysosplenium Scouleri Rose, Bot. Gaz. 23: 277. 1897.

Glabrous perennial with a slender stoloniferous rootstock; stems mostly ascending, often rooting at the lower nodes, 8–25 cm. long. Leaves opposite, the uppermost occasionally alternate, suborbicular, abruptly cuneiform at the base, crenate above, 8–15 mm. broad; petioles 1–2 cm. long; flowers solitary, axillary, short-pedicelled; hypanthium 2–3 mm. broad with rounded entire sepals; stamens 8, about equaling the hypanthium; capsule at length exserted.

Springy places, Humid Transition Zone; coastal region, British Columbia south to Mendocino County, California. Type locality: "Columbia River, on the North-West coast." April–June.

2. *Chrysosplenium tetrandrum* Th. Fries. Northern Water Carpet. Fig. 2264.

Chrysosplenium tetrandrum Th. Fries, Bot. Notiser 1858: 193. 1858.

Glabrous perennial from a slender stoloniferous rootstock; stems simple to above the middle, 2–15 cm. tall. Lower leaves on petioles 0.5–2 cm. long, thickish, reniform, shallowly crenate-lobed, lighter beneath than above, 4–12 mm. wide; upper leaves larger than the lower, suborbicular to broadly cuneate, becoming subsessile, the uppermost crowded and often reddish-tinged, simulating floral bracts; flowers short-pedicelled, clustered in the axils of the uppermost leaves; sepals usually 4; stamens 4, opposite the sepals; seeds small, numerous, brownish red.

Damp rock-crevices and springy places, Boreal Zones; Arctic regions of Eurasia and America, extending southward in North America to Colorado and reaching our region in Okanogan County, Washington (Mount Bonaparte). Type locality: Finmarken, Norway.

11. LITHOPHRÁGMA Nutt. Journ. Acad. Phila. 7: 26. 1834.

Slender perennial herbs with narrow bulblet-bearing rhizomes, simple stems and axial, sparingly leafy flowering shoots. Leaves mostly basal, petiolate, reniform or suborbicular, 3–5-parted or -lobed or merely rounded-crenate; petioles with stipule-like dilated bases. Flowers in simple mostly few-flowered racemes. Hypanthium from campanulate or hemispheric and adnate only to the base of the ovary to elongate-turbinate or obconic and adnate to the lower half of the ovary. Sepals 5, short, valvate in the bud, rounded or triangular. Petals 5, alternating with the sepals and inserted on the hypanthium just below the margin, white or pinkish, clawed, the blade oval or obovate to cuneate in outline, digitately or pinnately cleft, toothed or entire, much exceeding the sepals, at length deciduous. Stamens 10, inserted on the hypanthium, included; filaments short; anthers cordate, 2-celled. Ovary 1-celled with 3 many-seeded, parietal placentae, 3-valved at the

apex; ovary-beaks 3, short; stigmas obtuse or somewhat dilated. Fruit a capsule. Seeds horizontal, ovoid, with a distinct raphe. [Name Greek, meaning rock fence, the intended significance obscure.]

A genus of about a dozen species, all natives of western North America. Type species, *Lithophragma parviflora* (Hook.) Nutt.

Hypanthium campanulate, with a mostly rounded base, or the base only very slightly, though widely, tapering into the pedicel.

Petals 2–7 mm. long, deeply and palmately parted; hypanthium 3.4 mm. wide or less.

Stem leaves not bulbiferous in the axils.

Inflorescence not elongated or particularly narrow, relatively few-flowered; hypanthium not conspicuously striate.

Hypanthium at anthesis (with the sepals) not more than 3 mm. long; pedicels in fruit 8 mm. or more long, much longer than the capsules; leaves ternately divided to near the base.

1. *L. glabra*.

Hypanthium at anthesis (with the sepals) 3–4 mm. long; fruiting pedicels usually much shorter than 8 mm.; leaves deeply 3-lobed.

2. *L. breviloba*.

Inflorescence elongated, narrow, sometimes as much as 20-flowered; hypanthium more or less conspicuously striate.

3. *L. rupicola*.

Stem leaves not bulbiferous in the axils.

4. *L. bulbifera*.

Petals 5–12 mm. long, entire or only deeply toothed (not parted); hypanthium mostly 4 mm. or more in width.

Base of the hypanthium truncate or only slightly rounded; base of petal-blade plane and not toothed, the upper part more or less strongly toothed or incised (rarely entire).

5. *L. heterophylla*.

Base of the hypanthium merely obtuse, not really truncate; base of petal-blade somewhat involute, minutely crenulate to laciniate, the upper part entire or with a few lateral teeth.

6. *L. scabrella*.

Hypanthium rounded-turbinate to obconic, with a more or less acute base.

Hypanthium rounded-turbinate with an acutish, though not obconic base.

Basal leaves 3-parted to near the base; cauline leaves alternate; petals 3-cleft or -toothed; pedicels 2–5 mm. long.

7. *L. tripartita*.

Basal leaves round-lobed; cauline leaves a single pair, opposite; petals entire; pedicels 5–10 mm. long.

8. *L. Cymbalaria*.

Hypanthium with an obconic base.

Basal leaves divided to near the base into cuneate segments; hypanthium elongated-obconic.

Blades of the petals cleft scarcely half their lengths into 3 broadly oblong lobes; hypanthium 3 times as long as broad.

9. *L. trifoliata*.

Blades of the petals divided more than half their lengths into 3–7 linear-oblong divisions; hypanthium twice as long as broad.

10. *L. parviflora*.

Basal leaves variously lobed but not divided to near the base; hypanthium broadly obconic.

11. *L. affinis*.

1. *Lithophragma glabra* Nutt. Smooth *Lithophragma*. Fig. 2265.

Lithophragma glabra Nutt. in Torr. & Gray, Fl. N. Amer. 1: 584. 1840.

Tellima glabra Steudel, Nom. ed. 2. 2: 665. 1841.

Lithophragma tenella var. *florida* Suksdorf, W. Amer. Sci. 15: 61. 1906.

Lithophragma tenella of Pacific Coast authors, in part. Not Nutt.

Stem 1–2 dm. high, slender, minutely glandular-puberulent or glabrate. Petioles of the basal leaves 1.5–2 cm. long, puberulent; blades ternately divided to near the base, puberulent; divisions cuneate, 0.5–1.5 cm. long, 3-lobed; stem leaves as small or smaller, short-petioled, blades similar to those of the basal ones; stipules conspicuous, with a triangular or rounded basal free portion, somewhat erose; flowers 3–8; pedicels 2–4 mm. long, in fruit often over 1 cm. long; hypanthium campanulate, often abruptly acute at the base, puberulent, sometimes of a dark reddish hue, together with the sepals 2.5–4 mm. long; petals white or pinkish, 2–5 mm. in length, deeply and palmately parted into 3–5 linear-oblong divisions.

Damp soil, Arid Transition Zone; Montana and Wyoming westward through eastern Oregon and Washington to the Columbia River Gorge. Type locality: Blue Mountains of Oregon. March–May.

2. *Lithophragma breviloba* Rydb. Dainty *Lithophragma*. Fig. 2266.

Lithophragma breviloba Rydb. N. Amer. Fl. 22: 86. 1905.

Lithophragma tenella of California authors, in part. Not Nutt.

Stem 2–3.5 dm. high, glandular-pubescent. Petioles of the basal leaves 2–4 cm. long, the blades more or less deeply and ternately lobed or divided; divisions 5–10 mm. long, broadly cuneate, with 3 or 4 short rounded lobes; stem leaves more deeply divided and with angular oblong lobes, short-petioled, without bulblets in their axils; stipules membranous, not fimbriate, more or less obsolete; flowers 3–8; pedicels 2–5 mm. long; hypanthium hemispheric, together with the sepals 3–4 mm. long, densely glandular-puberulent; sepals triangular, acute; petals pink, 3–5 mm. long, palmately 3–5-parted into very narrow segments.

Open slopes and in pine woods, Arid Transition and Canadian Zones; northern Sierra Nevada to the Warner Mountains, California. Type locality: Sierra County, California. May–July.

3. *Lithophragma rupicola* Greene. Modoc *Lithophragma*. Fig. 2267.

Lithophragma rupicola Greene, Erythea 3: 102. 1895.

Stems not very slender, hispidulous-scabrous throughout, often reddish or straw-colored, 1.5–5 dm. high. Petioles of the reniform basal leaves often bulblet-bearing, 2.5–4 cm. long, the blades 2–3 cm. wide, more or less crisped-pubescent, parted to divided, the 3–5 larger cuneate divisions ternately parted and toothed toward the apex; stem leaves short-petioled, similarly divided into linear-spatulate segments, without bulbils in their axils; stipules conspicuous, membranous, fimbriolate, widened above and obliquely triangular; raceme elongated, 8–20-flowered,

conspicuously membranous-bracted, the very slender ascending pedicels 2–4 mm. long; hypanthium hemispheric-campanulate, crisped-hispidulous, conspicuously striate, often tinged with brown, 2.5–3 mm. high, in fruit becoming long-pedicelled, somewhat ovoid, 5–7 mm. long; sepals very short, broadly triangular; petals about 3 mm. long, white, digitately parted into 3–5 spatulate-oblong divisions.

Pine woods and under junipers, Arid Transition Zone; fairly common from southern Klamath County, Oregon, to Lassen County, California. Type locality: "Lava beds of Modoc County," California. May–July.

4. *Lithophragma bulbífera* Rydb. Rock Star. Fig. 2268.

Lithophragma bulbífera Rydb. N. Amer. Fl. 22: 86. 1905.

Lithophragma tenella var. *ramulosa* Suksdorf, W. Amer. Sci. 15: 61. 1906.

Lithophragma tenella of Pacific Coast authors, in part. Not Nutt.

Stem slender, 1–2 dm. high, glandular-puberulent. Petioles of the basal leaves 2–5 cm. long, puberulent to glabrate; blades broadly reniform in outline, ternately to quaternately divided to near the base; divisions 0.5–1.5 cm. long, cuneate or obovate, deeply 3-cleft, the lobes sometimes toothed; cauline leaves small, short-petioled, similar to the basal ones, bearing more or less conspicuous bulblets in their axils; stipules short, membranous, usually pinkish, rounded and fimbriate at the base; flowers 3–6, many replaced by bulblets; pedicels 1–5 mm. long, seldom lengthening in fruit to 1 cm.; hypanthium campanulate, shortly and abruptly acute at the base, densely glandular-scabrous to merely hirsutulous, together with the sepals 3–4, or in fruit 5 mm. long; petals digitately and more or less deeply 3–5-cleft, white or often pinkish.

Moist and shaded situations, Arid Transition and Boreal Zones; Black Hills of South Dakota south to Colorado and Utah, westward to British Columbia, and southward through eastern Washington and Oregon, and in California to the mountains of Trinity County and in the Sierra Nevada to Tulare County. Type locality: Battle, Carbon County, Wyoming. March–June.

5. *Lithophragma heterophýlla* (Hook. & Arn.) Torr. & Gray. Hill Star. Fig. 2269.

Tellima heterophylla Hook. & Arn. Bot. Beechey 346. 1838.

Lithophragma heterophylla Torr. & Gray, Fl. N. Amer. 1: 584. 1840.

Lithophragma Bolanderi A. Gray, Proc. Amer. Acad. 6: 535. 1865.

Lithophragma triloba Rydb. N. Amer. Fl. 22: 87. 1905.

Stems 2–5 dm. high, glandular-pubescent or somewhat hispidulous below. Basal leaves rounded-reniform, mostly shallowly 3-lobed and crenate, 1.5–4 cm. wide, more or less hirsute, their petioles 3–6 cm. long, puberulent and glandular, infrequently bearing bulbils in their axils; stem leaves 1–6 cm. long, short-petioled, exceedingly variable, mostly deeply 3-cleft, the divisions incised or toothed, their axils also sometimes bulbil-bearing; raceme usually 3–8-flowered; pedicels 1–2 mm. long; hypanthium campanulate, truncate or slightly rounded at the base, sometimes even inflated and saccate, together with the sepals 4–6 mm. long and about as wide; sepals triangular, acute; petals 4–7 mm. long, white, oblong to cuneate in outline, tapering to a narrow base, variously toothed or incised, though sometimes entire, usually with a stout tooth on either side near the apex.

Shaded places, Upper Sonoran and Transition Zones; Coast Ranges, from extreme southern Oregon to San Luis Obispo County, California, and much more sparingly southward to San Diego County. Less common in the Sierra Nevada foothills. Type locality: Santa Barbara, according to Torrey and Gray. March–July.

Lithophragma campanulata Howell, Fl. N.W. Amer. 200. 1898. Perhaps best considered a large-flowered form of *Lithophragma heterophylla*, the petals measuring up to 12 mm. in length. It is known only from the Siskiyou Mountains near the Oregon-California boundary.

6. *Lithophragma scabrélla* Greene. Sierra Star. Fig. 2270.

Tellima scabrella Greene, Pittonia 2: 162. 1891.

Lithophragma scabrella Greene, Erythea 3: 102. 1895.

Lithophragma laciniata Eastw. ex Rydb. N. Amer. Fl. 22: 87. 1905.

Stems slender, 2–6 dm. high, glandular-scabrous to merely hispidulous. Petioles of the basal leaves 2–6 cm. long, puberulent; blades suborbicular to reniform, 0.5–4 cm. broad, glabrate to glandular-hirsute, more or less distinctly crenate-lobed; stem leaves 2–6, more or less deeply divided into narrow toothed segments; flowers 3–14; pedicels 2–2.5 mm. long, lengthening in fruit; hypanthium campanulate, often striate, the base obtuse rather than truly truncate; sepals triangular-ovate, acute; petals white, 5–6 mm. long, with very slender exerted claws and blades varying from oblong to rhombic-ovate, entire or more frequently with small lateral teeth.

Wooded grassland, Upper Sonoran and Transition Zones; Liebre and Tehachapi Mountains and western slope of the Sierra Nevada from Kern County northward to Tehama County, and in the inner higher North Coast Ranges, California. Also on the Marysville Buttes. Type locality: pine wood south of Tehachapi, Kern County, California. May–July.

7. *Lithophragma tripartita* Greene. Thrice-parted Lithophragma. Fig. 2271.

Lithophragma tripartita Greene, Erythea 3: 102. 1895.

Tellima tripartita Greene, Erythea 1: 106. 1893.

Stems slender, 2–3 dm. high, hispidulous, the upper portion usually glandular-puberulent. Petioles of the basal leaves 3–5 cm. long, hispidulous; blades hirsute, ternately cleft to near the base into obovate-cuneate divisions, these 1–1.5 cm. long, pinnately incised, often again toothed; stem leaves 1 or 2, similar though somewhat smaller, alternate; flowers 3–7 in a loose raceme; pedicels 2–5 mm. long; hypanthium rounded-turbinate with an acute, though not obconic base, together with the sepals 4–5 mm. long and about 4 mm. broad, lengthening somewhat in fruit;

sepals ovate, acute; petals 6–8 mm. long, 3-cleft or 3-toothed at the apex, or the upper rarely entire.

Pine woods, Arid Transition Zone; mountains of southern California. Type locality: mountains near San Jacinto, California. May–June.

8. *Lithophragma Cymbalaria* Torr. & Gray. Mission Star. Fig. 2272.

Lithophragma Cymbalaria Torr. & Gray, Fl. N. Amer. 1: 585. 1840.

Tellima Cymbalaria Steudel, Nom. ed. 2: 665. 1841.

Stems slender, 1.5–3 dm. high, finely glandular-puberulent. Petioles of the basal leaves 2–5 cm. long, finely puberulent; blades reniform, 3–5-lobed; lobes rounded-crenate with broad and rounded teeth, or entire; cauline leaves 2, opposite, on slender petioles, well up on the stem, once or twice ternately divided, lobes narrow; flowers 3–6; pedicels 5–10 mm. long, usually longer than the hypanthium; this rounded-turbinate, with an obtuse and not obconic base, together with the sepals 3–6 mm. long; sepals triangular, acute; petals white, 6–9 mm. long, with slender claws and rhombic-oval to oblong-spatulate entire blades.

Open shaded places, Upper Sonoran Zone; Channel Islands off the southern California coast; local at Palomar Mountain in San Diego County, and the coastal region of Ventura and Santa Barbara Counties, thence northward in the Inner Coast Range from San Luis Obispo County to Stanislaus County, California. Type locality: near Santa Barbara, California. March–April.

9. *Lithophragma trifoliata* Eastw. Club-shaped Lithophragma. Fig. 2273.

Lithophragma trifoliata Eastw. Bull. Torrey Club 32: 200. 1905.

Stems striate, stout, 2–3 dm. high, scabrous-hispid below, the upper part glandular as well. Petioles of the basal leaves lax, dilated at the bases, 2–5 cm. long, also glandular-hirsute; blades markedly hirsute, 1–2 cm. wide, cordate in outline, divided to the base into 3–5 broadly cuneate lobes, these more or less deeply 3-cleft and again 3-lobed; stem leaves usually 2, triangular in outline, similarly cleft, their petioles 1–3 cm. long; stipules broad, fimbriate; raceme subcapitate, 5–8-flowered; bracts hyaline, conspicuous; pedicels 1–3 mm. long; hypanthium densely hirsute-canescens, with an elongated obconic base, widest at the point of insertion of the petals and stamens, the whole about 3 times as long as broad, 7–8 mm. long; sepals relatively long and narrow, acute; petals very broadly cuneate, 8–10 mm. long, with 3 broadly oblong or ovate lobes.

Foothills, forest-covered mountain slopes and lava beds, Upper Sonoran and Arid Transition Zones; Modoc County to Yuba County, California, extending into the Sacramento Valley in Tehama County. Type locality: foothills near Chico, Butte County, California. March–April.

10. *Lithophragma parviflora* (Hook.) Nutt. Prairie Star, Star Flower.

Fig. 2274.

Tellima parviflora Hook. Fl. Bor. Amer. 1: 239. 1839.

Lithophragma parviflora Nutt. in Torr. & Gray, Fl. N. Amer. 1: 584. 1840.

Lithophragma austromontana Heller, Muhlenbergia 2: 53. 1905.

Lithophragma anemonoides Greene, Leaflets Bot. Obs. 2: 87. 1910.

Lithophragma tenella of some Pacific Coast authors, in part. Not Nutt.

Stems 1–3 dm. high, more or less densely glandular-puberulent and somewhat scabrous. Petioles of the basal leaves 2–6 cm. long; blades sparsely covered with appressed whitish hairs, divided to the base into 3–5 divisions, these 1–3 cm. long, widely cuneate and once or twice 3-cleft into oblong divisions; stem leaves 2 or 3, similar, occasionally as large as or larger than the radical ones; raceme short, 3–9-flowered; pedicels mostly erect, 2–5 mm. long; hypanthium elongated-obconic, the top of the ovary marked by a dark yellow band, at length almost clavate, together with the sepals 5–8 mm. long, in fruit often increasing to 1 cm. in length; petals white or pinkish, deeply 3–5 cleft into narrowly oblong divisions, attenuate below into a slender claw, 4–10 mm. long.

In rocky and gravelly places, Upper Sonoran and Arid Transition Zones; Alberta to British Columbia, south to Colorado and throughout Washington and Oregon and sparingly southward in the Sierra Nevada of California to Kern County and thence northward in the Inner Coast Range to San Benito County. Type locality: "Northern California," Menzies. Probably Oregon. April–June.

11. *Lithophragma affinis* A. Gray. Woodland Star. Fig. 2275.

Lithophragma affinis A. Gray, Proc. Amer. Acad. 6: 534. 1865.

Tellima affinis A. Gray, Bot. Calif. 1: 198. 1876.

Lithophragma intermedia Rydb. N. Amer. Fl. 22: 88. 1905.

Lithophragma catalinae Rydb. loc. cit.

Lithophragma trifida Eastw. ex Rydb. op. cit. 22: 89. 1905.

Stems stout, 3–5 dm. high, glandular-hirsutulous. Petioles of the basal leaves 1.5–8 cm. long; blades reniform to ovate-reniform in outline, 1–3 cm. long, some of them ternately divided, hirsutulous, often of a distinctly purplish hue beneath, the divisions orbicular to ovate, ternately lobed or crenate; cauline leaves 1–3, alternate, mostly parted into 3 broad divisions which are deeply incised, or merely lobed or toothed; stipules mostly broad and fimbriate; petioles 1–2 cm. long; flowers 6–12; pedicels 2–8 mm. long; hypanthium spreading at the top, the lower half broadly obconic, densely covered with glandular hairs, with the sepals 5–7 mm. long; sepals ovate, mostly acute; petals white, 6–10 mm. long, cuneate, very broad and mostly 3-lobed at the apex with almost equal lobes.

Rocky shaded ground and open woods, Upper Sonoran and Transition Zones; Coast Ranges and Sierra Nevada from southern Oregon to southern California. Also in the Great Valley and on the Channel Islands. Type locality: California, around and north of San Francisco. March–May.

12. *TIARÉLLA* L. Sp. Pl. 405. 1753.

Perennial slender erect herbs with the leaves mainly basal, long-petioled, lobed or 3-foliate, with small stipules adnate to the petiole and lateral leafy flowering shoots from a scaly rootstock. Inflorescence a raceme or, in ours, a panicle. Hypanthium small, short-campanulate, nearly free from the ovary. Sepals 5, ovate or lanceolate. Petals 5, clawed, with oblong or elliptic blades or, as in ours, clawless and linear-subulate. Stamens 10, conspicuously exerted, with long filiform filaments. Ovary 1-celled, 2-horned, with 2 parietal, in fruit nearly basal placentae. Styles 2, elongated. Capsule membranous, with 2 very unequal valves. Seeds usually few. [Name a diminutive of the Greek *tiara*, a high cap, in allusion to the form of the capsule.]

A genus of about 6 species, natives of North America, Japan and the Himalayas. Besides the following, two species occur in the eastern United States. Type species, *Tiarella cordifolia* L.

Leaves ternately compound.

Leaflets coarsely crenate-dentate.

Leaflets deeply laciniate.

Leaves simple, merely lobed.

1. *T. trifoliata*.

2. *T. laciniata*.

3. *T. unifoliata*.

1. *Tiarella trifoliata* L. Laceflower. Fig. 2276.

Tiarella trifoliata L. Sp. Pl. 406. 1753.

Tiarella stenopetala Presl, Rel. Haenk. 2: 55. 1831.

Blondia trifoliata Raf. Fl. Tell. 2: 75. 1836.

Tiarella rhombifolia Nutt. in Torr. & Gray, Fl. N. Amer. 1: 588. 1840.

Sparsely and softly hirsute caulescent perennial; flowering branches slender, 2-6 dm. high, glabrous or glabrate below, glandular-hirsute above, 2-4-leaved. Leaves trifoliate, the petioles very short; petioles of the basal ones 5-15 cm. long, glabrous to conspicuously villous-hirsute; middle leaflet rhombic, more or less 3-lobed and repandly apiculate-dentate with broadly ovate teeth, sparingly hirsute, becoming glabrous in age, 2-8 cm. long; lateral leaflets obliquely ovate, mostly 2-cleft; leaves of the flowering branches similar but smaller; inflorescence an elongated and narrow panicle; sepals white or pinkish, narrowly ovate, acute, glandular-dotted on the back, about 1.5 mm. long; petals white, linear-subulate, like the stamens 3-4 times as long as the sepals; carpels narrowly oval, obtusish, the larger 7-10 mm., the smaller 4-6 mm. long.

In forests, Humid Transition Zone; coastal region of central Oregon north to Alaska and southeast into eastern Asia. Type locality: "Habitat in Asia boreali." April-Aug.

2. *Tiarella laciniata* Hook. Laciniate Tiarella. Fig. 2277.

Tiarella laciniata Hook. Fl. Bor. Amer. 1: 239. 1832.

Petalosteira laciniata Raf. Fl. Tell. 2: 74. 1836.

Tiarella trifoliata var. *laciniata* Wheelock, Bull. Torrey Club 23: 72. 1896.

Flowering branches 2.5-4 dm. high, glabrous to sparingly glandular-hirsute, especially above; leaves trifoliate, sparingly hirsute; middle leaflet rhombic in outline, deeply 2-cleft and with oblong or ovate mucronate teeth, 2-6 cm. long; lateral ones obliquely ovate, laciniately and unequally 2-cleft, almost to the base on the outside, and farther up on the leaflet and not so deeply on the inside, otherwise cleft and toothed as the middle one; leaves of the flowering branches similar but smaller and the upper short-petioled; inflorescence, flowers and fruit as in the preceding.

In woods, rare, Humid Transition and Canadian Zones; southern Alaska to northern Oregon. Type locality: "North-West coast of America," Menzies. June-Aug.

3. *Tiarella unifoliata* Hook. Sugar-scoop. Fig. 2278.

Tiarella unifoliata Hook. Fl. Bor. Amer. 1: 238. 1832.

Petalosteira unifoliata Raf. Fl. Tell. 2: 74. 1836.

Heuchera californica Kell. Proc. Calif. Acad. 5: 53. 1873.

Tiarella unifoliata var. *procera* A. Gray, Bot. Calif. 1: 199. 1876.

Tiarella trifoliata var. *unifoliata* Kurtz, Bot. Jahrb. 19: 378. 1894.

Tiarella californica Rydb. N. Amer. Fl. 22: 118. 1905.

Flowering branches 1-5 dm. high, glabrous or slightly to densely hirsute with whitish hairs, viscid-puberulent to glandular-pubescent above. Basal leaves broadly cordate in outline, sparingly or quite hirsute on both sides to glabrate in age, 4-10 cm. wide, acutely 3-5-lobed with very deep to mostly shallow, broadly ovate, acute or obtusish lobes, doubly crenate to coarsely crenate-dentate, the teeth mucronate; petioles 0.5-2 dm. high, glabrous to densely hirsute with whitish hairs; cauline leaves 1-4, similar to the basal but smaller and shorter-petioled; inflorescence a narrow panicle; sepals white to pinkish, ovate-oblong, the upper somewhat larger and longer than the lower, 1.5-2.5 mm. long; the linear-subulate white petals and the stamens 2-3 times as long; carpels oblong, abruptly acute, the larger 9-12 mm. long, the smaller 4-6 mm. long.

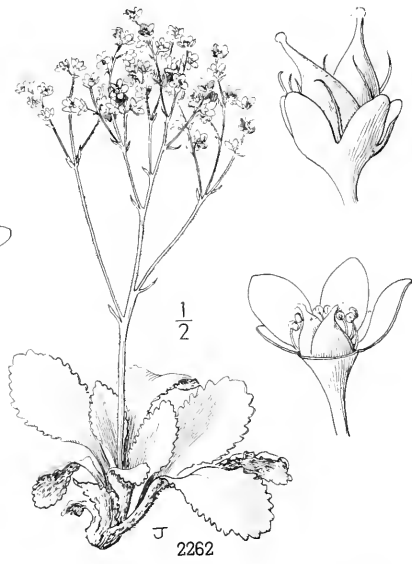
Shaded ravines and woods, Humid Transition and Canadian Zones; Alberta and southern Alaska to western Montana and south through Washington and Oregon and the coastal region of California to the Santa Cruz Mountains. Type locality: Rocky Mountains, near the source of the Columbia River. May-July. Forms in which the leaves approach those of *Tiarella trifoliata* are not infrequent.

13. *TOLMIÈA* Torr. & Gray, Fl. N. Amer. 1: 582. 1840.

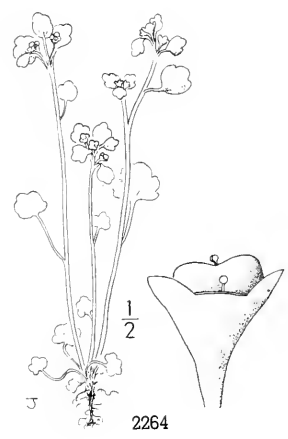
Glandular-pubescent perennial herbs with scaly rootstocks, long-petioled cordate



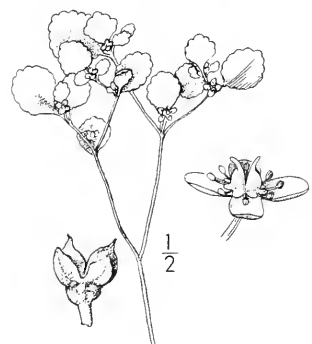
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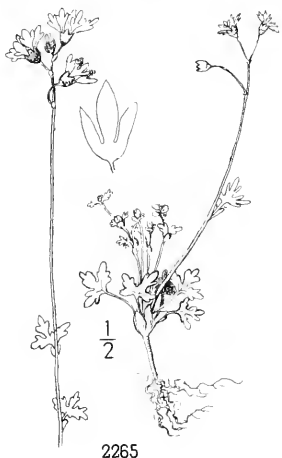
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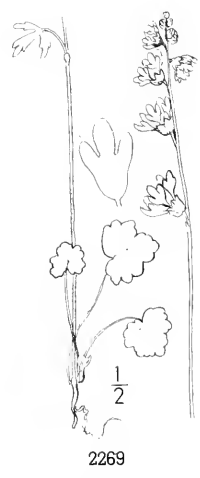
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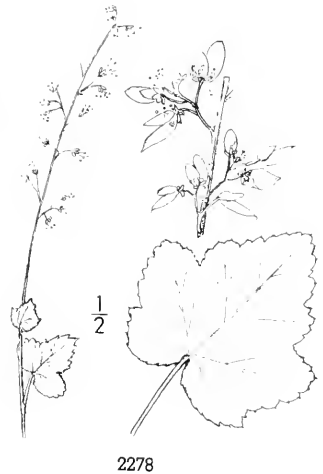
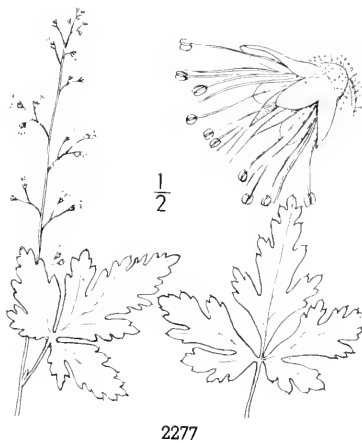
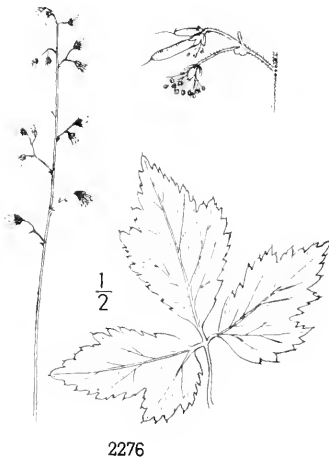
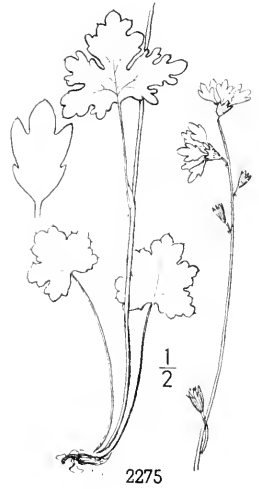
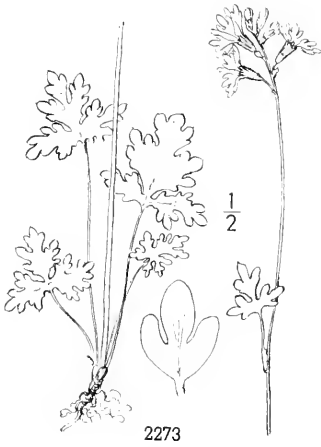
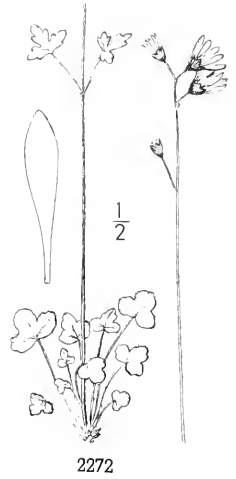
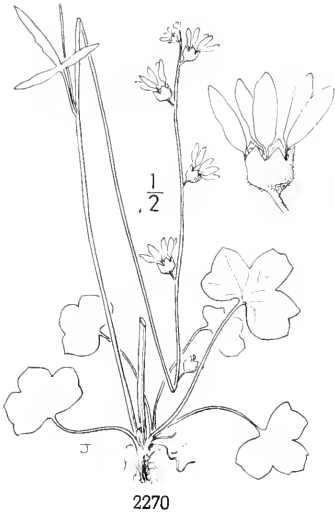


2269

2261. *Saxifraga fallax*
2262. *Saxifraga occidentalis*
2263. *Chrysosplenium glechomae-folium*

2264. *Chrysosplenium tetrandrum*
2265. *Lithophragma glabra*
2266. *Lithophragma breviloba*

2267. *Lithophragma rupicola*
2268. *Lithophragma bulbifera*
2269. *Lithophragma heterophyllum*



2270. *Lithophragma scabrella*
 2271. *Lithophragma tripartita*
 2272. *Lithophragma cymbalaria*

2273. *Lithophragma trifoliata*
 2274. *Lithophragma parviflora*
 2275. *Lithophragma affinis*

2276. *Tiarella trifoliata*
 2277. *Tiarella laciniata*
 2278. *Tiarella unifoliata*

radical leaves and lateral leafy racemose flowering branches. Stipules membranous. Racemes elongated, bracteate, 20–60-flowered. Hypanthium cylindric-funnelform, free from the ovary, 9-veined, slightly gibbous at the base, split along the lower side to almost the very base and unequally 4-cleft at the apex into 5 sepals, the three central ones longer and broader than the two lateral ones. Petals 4, rarely 5, filiform, entire, inserted in the sinuses between the sepals, persistent. Stamens 3, rarely 2, scarcely exserted, inserted on the hypanthium opposite the three larger sepals; filaments unequal; anthers reniform. Ovary bicarpellary, 1-celled, attenuate and slightly stipitate at the base, with two long equal beaks at the apex; stigmas obtuse; placentae 2, parietal, many-seeded. Seeds minute, subglobose, muricate-hispid. [Dedicated to Dr. W. F. Tolmie, an early collector and surgeon of the Hudson Bay Company at Fort Vancouver.]

A monotypic genus confined to the Pacific Coast of northwestern North America.

1. *Tolmiea Menziesii* (Pursh) Torr. & Gray. Youth-on-Age, Thousand Mothers. Fig. 2279.

Tiarella Menziesii Pursh, Fl. Amer. Sept. 313. 1814.

Heuchera Menziesii Hook. Fl. Bor. Amer. 1: 237. 1832.

Leptaxis Menziesii Raf. Fl. Tell. 2: 76. 1836.

Tolmiea Menziesii Torr. & Gray, Fl. N. Amer. 1: 582. 1840.

Stems clustered, arising from a scaly, creeping and infrequently branched caudex without any apparent main stem. Petioles of the basal leaves 0.5–2 dm. long, hirsute; blades cordate, acute, obscurely lobed and repandly cuspidate-toothed, hirsute and ciliate, 2–12 cm. wide; leaves of the flowering branches similar but smaller and with successively shorter petioles; flowers slender-pedicelled, 3–8 mm. long, subtended by small, lanceolate, scarious, and fimbriate bracts; hypanthium oblique, greenish, veined, and more or less tinged with dark red-purple; the 3 upper sepals ovate-oblong with spreading obtuse tips 3 mm. long, the 2 lateral ones shorter, narrow and acuminate; petals capillary, brown, exserted from the sinuses between the sepals, about twice as long as the latter; stamens slightly exserted; ovary oblong, the 2 valves spreading in age, the fruit protruding through the slit on the lower side of the persistent hypanthium.

Along mountain streams and in cool woods, Humid Transition and Canadian Zones; west of the Cascade Mountains from southern Alaska to Oregon and southward in the Coast Ranges of California to Mendocino County. Type locality: "North-West coast of America," Menzies. May–June. Propagates itself vegetatively by means of adventitious buds formed in the sinuses of the leaf-blades.

14. *BENSÔNIA* Abrams & Bacigalupi, Contr. Dudley Herb. 1: 95. 1929.

Perennial with slender branching scaly rootstocks, simple scapiform flowering branches and basal petiolate cordate leaves. Hypanthium shallowly campanulate, slightly irregular, free from the ovary except at the very base, caducous in fruit. Sepals 5, irregularly placed, three approximate, the other two more distant, all 3-nerved. Petals 5, filiform, entire. Stamens 5, opposite the sepals; filaments elongated. Pistil 2- (occasionally 3-) valved at the apex; carpels slightly compressed and sharply angled on the back, narrowed to the slender styles; placentae parietal in fruit seemingly basal; ovules many. [Named for the late Gilbert T. Benson, librarian and assistant curator of the Dudley Herbarium and promising student of the Pacific Coast flora.]

A monotypic genus restricted to the Siskiyou Mountain region of southwestern Oregon.

1. *Bensonia oregona* Abrams & Bacigalupi. *Bensonia*. Fig. 2280.

Bensonia oregona Abrams & Bacigalupi, Contr. Dudley Herb. 1: 95. 1929.

Scales of the rootstock more or less ciliate. Leaves all basal; petioles slender, 3–7 cm. long, sparsely villous with elongated brownish hairs; leaf-blades cordate, 2.5–4.5 cm. long and about as broad, crenately 7-lobed, the lobes crenately toothed and each tooth short-cuspidate, the upper surface glabrous or with a few scattered short appressed hairs, the lower with a few hairs on the veins; flowering stalk 2 dm. high, slender, sparsely pilose; raceme rather densely 15–20-flowered; pedicels very short, scarcely 1 mm. long, with a minute linear-subulate bractlet adnate to the base; hypanthium open-campanulate to almost saucer-shaped, like the sepals creamy-white, 2 mm. broad; sepals 2 mm. long, covered with short-stalked glands, the nerves simple; petals narrowly linear in general outline, about equaling the filaments, slightly broader at the middle and narrowed toward each end; stamens 3 mm. long, the anthers conspicuously salmon-colored; styles nearly as long as the stamens.

Damp soil, Canadian Zone; altitudes of 4,000–4,500 feet in the Siskiyou Mountains of Curry and Josephine Counties, Oregon. Type locality: Snow Camp, Curry County, Oregon. June–July.

15. *TELLÌMA* R. Br. in Frankl. 1st Jour. Bot. App. 765. 1823.

Coarse hirsute perennials with numerous basal leaves and axillary leafy flowering shoots arising from a thick scaly rootstock. Stipules small, with scarious and fimbriate edges. Flowers in elongated simple racemes. Hypanthium large, urn-shaped or inflated-campanulate, tapering somewhat at the base, adnate to the ovary for one-third to one-half

its length. Sepals 5, ovate, erect, valvate in bud. Petals 5, alternating with the sepals, sessile. Stamens 10, on very short filaments, entirely included; anthers ovate, 2-celled. Ovary 1-celled with 2 parietal, many-seeded placentae, narrowly 2-beaked at the apex; stigmas large, capitate. Capsule opening longitudinally between the beaks. Seeds oblong, tuberculate. [Name appears to be an anagram of *Mitella*, from which genus this plant was segregated by Brown.]

A monotypic genus confined to the Pacific Coast of North America.

1. *Tellima grandiflora* (Pursh) Dougl. Fringe Cups. Fig. 2281.

Mitella grandiflora Pursh, Fl. Amer. Sept. 314. 1814.

Tellima grandiflora Dougl. Bot. Reg. 14: pl. 1178. 1828.

Tiarella alternifolia Fisch. ex Ser. in DC. Prod. 4: 50. 1830.

Tellima odorata Howell, Fl. N.W. Amer. 199. 1898.

Tellima breviflora Rydb. N. Amer. Fl. 22: 90. 1905.

Main stem none; flowering branches stout, 3-8 dm. high, hirsute with long, brownish hairs, glandular above, leafy. Petioles of the basal leaves 0.5-2 dm. long, hirsute; blades reniform or cordate, sparingly hirsute, prominently reticulate-veined, shallowly 3-7-lobed, dentate with broadly ovate teeth, 4-10 cm. broad; leaves of the flowering branches similar in shape, though successively smaller, with small brownish stipules and petioles 2-20 mm. long; flowers short-pedicelled, slightly drooping, subtended by minute bracts; hypanthium glandular-puberulent, striate, broadly campanulate and somewhat turbinate at the base, occasionally turbinate-campanulate, 8-10 mm. long and 4-7 mm. wide; sepals 2-3 mm. long; petals lanceolate-acuminate in outline, deeply laciniate-pinnatifid, the segments filiform, greenish white becoming maroon, sessile by a broadly to narrowly cuneate base, 4-6 mm. long, spreading; pedicels in fruit considerably thickened; capsule ovate, open at the top, the indurated styles divergent; fruit at length erect.

In rock crevices and moist woods, Humid and Arid Transition Zones; southern Alaska southward through western Washington and Oregon to Placer County in the Sierra Nevada and along the coast to the Santa Lucia Mountains, California. Type locality: "North-West coast of America," Menzies. April-June.

16. *MITELLÁSTRA* Howell, Fl. N.W. Amer. 201. 1898.

Slender glandular-pubescent perennial herbs with long-petioled basal leaves and lateral leafy flowering shoots arising from a scaly rootstock. Inflorescence a racemiform cyme. Hypanthium saucer-shaped, adnate only to the lower third of the ovary. Sepals 5, triangular-ovate, valvate in aestivation. Petals 5, pectinately pinnatifid with filiform divisions, inserted just below the sinuses of the hypanthium, deciduous. Stamens 5, opposite the sepals; filaments slender, about two-thirds as long as the sepals. Ovary about two-thirds superior with two parietal many-ovuled placentae. Styles 2, distinct, slender, tapering into the stigmas, which are entire. Capsule 2-valved at the summit. Seeds black and shining. [Name from the Latin, *Mitella*, the diminutive of *mitra*, a mitre, referring to the shape of the young capsule, and *aster*, a star, doubtless suggested by the outline of the hypanthium.]

A monotypic genus, native of the northwestern coast of North America.

1. *Mitellastra cauléscens* (Nutt.) Howell. Star-shaped Mitrewort. Fig. 2282.

Mitella caulescens Nutt. in Torr. & Gray, Fl. N. Amer. 1: 586. 1840.

Mitellastra caulescens Howell, Fl. N.W. Amer. 201. 1898.

Perennial with short creeping or ascending rootstocks producing slender leafy runners. Flowering branches 1-3-leaved, glandular-puberulent and somewhat hirsute toward the base, 1.5-4 dm. high; basal leaves broadly cordate or round-reniform, 3-7-lobed with triangular-ovate lobes and crenate with mucronate teeth, hirsute and minutely scabrous on both sides, 3-7 cm. broad; their petioles 5-12 cm. long, hirsute with whitish reflexed hairs; stem leaves similar but successively smaller, shorter-petioled, alternate and bearing a pair of green stipules; flowers yellow-green, together with the sepals 5-7 mm. wide; petals purplish at the base; stamens with subulate filaments, purple except at the very top, connivent over the recurved, elongated, simple styles; capsule globose, the upper part free from the hypanthium.

Along streams and in damp woods, Humid and Arid Transition Zones; British Columbia eastward to western Montana and south in the coastal region to Humboldt County, California. Type locality: near the mouth of the Willamette River, Oregon. May-June.

17. *PECTIÁNTIA* Raf. Fl. Tell. 2: 72. 1836.

Low perennials with scaly rootstocks and lateral, scapiform flowering branches. Inflorescence racemose. Hypanthium saucer-shaped, almost entirely adnate to the depressed ovary. Sepals 5, inserted on the very short free portion of the hypanthium, pectinately pinnatifid with filiform divisions, at length deciduous. Stamens 5, inserted on the margin of a distinct disk which covers the ovary; filaments very short, inflexed; anthers 2-celled, reniform. Ovary 1-celled, flattened, mostly inferior, with 2 parietal, though apparently almost basal placentae. Stigmas 2, subsessile, 2-lobed at the apex. Seeds numerous,

obovoid, horizontal or ascending, comparatively smooth and shining. [Name derived from the Latin *pecten*, meaning comb, in reference to the outline of the petals.]

A genus of about 5 species, natives of western North America and Japan. Type species, *Pectiantia pentandra* (Hook.) Rydb.

Stamens opposite the petals.

Stamens opposite the sepals.

Leaf-blades reniform, glabrate.

Leaf-blades oval with a cordate base, distinctly hirsute.

1. *P. pentandra*.

2. *P. Breweri*.

3. *P. ovalis*.

1. *Pectiantia pentandra* (Hook.) Rydb. Alpine Mitrewort or Bishop's Cap. Fig. 2283.

Mitella pentandra Hook. Bot. Mag. 56: pl. 2933. 1829.

Drummondia mitelloides DC. Prod. 4: 50. 1830.

Pectiantia mitelloides Raf. Fl. Tell. 2: 72. 1836.

Mitellopsis Drummondia Meisn. Pl. Vasc. Gen. Comm. 100. 1838.

Mitellopsis pentandra Walp. Rep. 2: 370. 1843.

Pectiantia pentandra Rydb. N. Amer. Fl. 22: 93. 1905.

Pectiantia latiflora Rydb. loc. cit.

More or less glabrate perennial with a short rootstock; scapes slender, 1–3 dm. high, minutely glandular-puberulent, especially above. Leaves cordate to round-reniform, coarsely crenate to unequally serrate, obscurely round-lobed, glabrous to sparingly pubescent on both sides with distinct short white hairs, 2–6 cm. wide; petioles 2–12 cm. long, glabrous to tawny-hirsute; raceme lax, 8–20-flowered; hypanthium including the sepals 2.5–3.5 mm. wide, green, often purplish within; sepals broadly triangular, obtuse, often recurved; petals irregular, pectinately pinnatifid with filiform pinnae and rachis; stamens 5, opposite the petals.

In damp shaded woods and bogs, Canadian and Hudsonian Zones; Alberta and Alaska southward to Colorado and the northern Coast Ranges and southern Sierra Nevada of California. Type locality: "Rocky Mountains of North America." Type specimen raised from seed collected by Drummond. May–July.

2. *Pectiantia Brèweri* (A. Gray) Rydb. Brewer's Mitrewort. Fig. 2284.

Mitella Breweri A. Gray, Proc. Amer. Acad. 6: 533. 1865.

Pectiantia Breweri Rydb. N. Amer. Fl. 22: 93. 1905.

Comparatively glabrous perennial from a rather slender rootstock; scapes one or several, slender, 6 mm.–3 dm. high, scarcely perceptibly pubescent and glandular. Leaves reniform to round-cordate, glabrous to sparingly pubescent on both sides, serrate-crenate with short apiculate teeth, obscurely shallow-lobed, 4–8 cm. broad; petioles hirsute with tawny and more or less curled hairs, especially above, 4–10 cm. long, subtended by large, scarious brown bracts; flowers greenish, occasionally in pairs; hypanthium saucer-shaped, together with the sepals 3–4 mm. broad; sepals very broadly ovate, obtuse, reflexed; petals pinnate with filiform pinnae; stamens 5, opposite the sepals.

In damp coniferous forests, Canadian and Hudsonian Zones; British Columbia and Alberta to northern Idaho, and southward in the Cascade Mountains and Sierra Nevada to Tulare County, California. Type locality: Mount Hoffmann, Mariposa County, California. June–Aug.

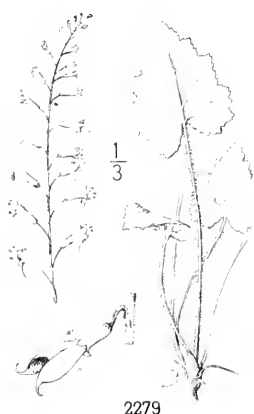
3. *Pectiantia ovalis* (Greene) Rydb. Coastal Mitrewort. Fig. 2285.

Mitella ovalis Greene, Pittonia 1: 32. 1887.

Mitella Hallii Howell, Erythea 3: 33. 1895.

Pectiantia ovalis Rydb. N. Amer. Fl. 22: 94. 1905.

Hirsute perennial from a slender rootstock; scapes 1–3, 1.5–3 dm. high, minutely glandular-hirsute above, conspicuously hirsute with reflexed hairs toward the base. Leaves oval to ob-



2279. *Tolmiea Menziesii*



2280. *Bensonia oregona*



2281. *Tellima grandiflora*

long, obtuse or acutish, with a cordate base, shallowly lobed, the lobes crenate or crenate-serrate in outline, these again crenate or crenate-serrate, the whole blade covered with scattered, rather coarse, whitish and somewhat curved hairs, 3–6 cm. long and 2–4 cm. wide; petioles densely ferruginous-hirsute with strongly deflexed hairs, 3–9 cm. long; flowers yellowish green; hypanthium with the sepals 2–3 mm. broad.

In wet places, Humid Transition Zone; in the coastal region from British Columbia to Marin County, California. Type locality: Mendocino County, California. April–May.

18. *OZOMELIS* Raf. Fl. Tell. 2: 73. 1836.

Perennials with scaly rootstocks and lateral, mostly scapiform flowering shoots. Leaves basal, long-petioled, with rounded-reniform or cordate blades. Inflorescence racemose. Hypanthium campanulate, adnate to the ovary for not more than half its length. Sepals 5, lance-ovate, ovate or oblong, erect, thin and petaloid, about equaling or shorter than the hypanthium, valvate in the bud. Petals 5 (rarely lacking), 3-cleft, toothed or entire. Stamens 5, opposite the sepals; filaments very short, erect; anthers reniform. Ovary half-inferior or more, 1-celled with 2 parietal many-ovuled placentae; styles 2, short; stigmas capitate, entire. [The significance of the name is obscure.]

A genus of about 5 species, natives of western North America. Type species, *Ozomelis trifida* (Graham) Rydb.

Leaves cordate to rounded-reniform, not angularly lobed, all basal.

Petals cuneate with a long narrow claw, digitately trifid at the apex into broadened subequal divisions.

1. *O. trifida*.

Petals filiform and trisected just above the middle into filiform divaricate divisions.

2. *O. stauropetala*.

Leaves cordate-triangular, angularly lobed; one cauline leaf usually present.

3. *O. diversifolia*.

1. *Ozomelis trifida* (Graham) Rydb. Pacific *Ozomelis*. Fig. 2286.

Mitella trifida Graham, Edinb. New Phil. Journ. 1829: 185. 1829.

Ozomelis varians Raf. Fl. Tell. 2: 73. 1836.

Mitellopsis Hookeri Meisn. Pl. Vasc. Gen. Comm. 100. 1838.

Mitellopsis trifida Walp. Rep. 2: 370. 1848.

Ozomelis trifida Rydb. N. Amer. Fl. 22: 95. 1905.

Ozomelis pacifica Rydb. loc. cit.

Sparsely hirsute acaulescent perennial from a semi-erect or creeping rootstock. Leaf-blades cordate or round-reniform, minutely glandular-ciliate, 2–5 cm. wide, crenately lobed, the lobes crenate-serrate, glandular-apiculate-toothed, sparingly hirsute on both sides with conspicuous hairs; petioles sparingly retrorse-hirsute to densely so above, 3–9 cm. long; scapes 1 to several, erect, glandular-scabrous, sometimes bracteate, 1.5–4.5 dm. high; racemes 5–20-flowered; pedicels 1 mm. or less long, subtended by small pinkish fimbriate bracts; hypanthium turbinate-campanulate, comparatively glabrate, including the sepals about 3 mm. long; sepals erect, whitish, often pink- or violet-tinged, oblong to ovate, acute and often slightly mucronate; petals half again as long as the sepals, white, only slightly spreading; ovary half inferior; styles thick; stigmas capitate.

Damp mountain woods, Humid Transition and Canadian Zones; British Columbia east to Alberta and south to Trinity and Plumas Counties, California. Type locality: Rocky Mountains, near Smoky River, on the east side, near latitude 56°. May–Aug.

Ozomelis micrantha (Piper) Rydb. N. Amer. Fl. 22: 96. 1905. (*Mitella micrantha* Piper, Erythra 7: 162. 1899.) Known only from the original collection at Fort Colville, Washington. It is a very small-flowered form, distinguished principally by the possession of oblanceolate, entire and acuminate petals.

2. *Ozomelis stauropetala* (Piper) Rydb. Cross-shaped *Ozomelis*. Fig. 2287.

Mitella stauropetala Piper, Erythra 7: 161. 1899.

Ozomelis stauropetala Rydb. N. Amer. Fl. 22: 95. 1905.

More or less hirsute acaulescent perennial from a creeping, rather slender rootstock. Leaves cordate to rounded-reniform, sparsely appressed-hirsute on both sides, mostly obscurely 5–7-lobed, the lobes broadly crenate to more finely crenate-serrate, glandular-ciliate, 2.5–7 cm. broad; petioles 4–12 cm. long, retrorsely hirsute and minutely glandular, especially above; scapes 1–6, erect, slender, bearing a few scarious fimbriate bracts, minutely scabrous and often hirsute toward the base, glandular-puberulent above, 2.5–5 dm. high; racemes mostly secund, 10–35-flowered, 6–20 cm. long; pedicels 1 mm. long, subtended by minute, acuminate and lacerate bracts; hypanthium turbinate-campanulate, about 2 mm. long; sepals oblong-ovate, whitish, often purple-tinged, as long as or slightly longer than the hypanthium, usually ascending; petals white, often purplish toward the apex, filiform, trisected just above the middle, spreading, fully twice as long as the sepals; anthers oblong, white or purple, nearly sessile.

In moist woods and springy places, Canadian and Hudsonian Zones; western Montana to Colorado, westward and southward to the mountains of eastern Washington and Oregon. Type locality: Craig Mountains, Nez Perces County, Idaho. May–July.

3. *Ozomelis diversifolia* (Greene) Rydb. Varied-leaved *Ozomelis*. Fig. 2288.

Mitella diversifolia Greene, Pittonia 1: 32. 1887.

Ozomelis diversifolia Rydb. N. Amer. Fl. 22: 94. 1905.

Minutely scabrous perennial from a creeping rhizome. Basal leaves triangular-cordate with a mostly acute tip, angularly lobed, irregularly crenate-serrate, glandular-ciliate and glandular-puberulent on both sides, with a few strigose hairs on the upper surface, 4–5 cm. wide and

slightly longer; petioles of the basal leaves 3–10 cm. long, retrorse-hirsute; flowering branches 1–4, slender or stoutish, glandular-puberulent throughout, 2–6 dm. high, usually bearing a single long-petioled leaf 0.5–1 cm. from the base; racemes slender, not secund; flowers almost sessile; hypanthium turbinate-campanulate, including the sepals about 2.5 mm. long; sepals erect, whitish, acute, strongly mucronate, the back covered with gland-tipped hairs toward the apex; petals cuneate with a slender tapering claw, palmately 3–5-cleft toward the apex into slender divisions, erect, about 2 mm. long; stamens 5, opposite the sepals, almost sessile; ovary three-fourths inferior; styles very short and thick; stigmas capitate.

Wet places in the mountains, Humid Transition Zone; western Washington south to Trinity County, California. Type locality: summit of the Trinity Mountains, Trinity County, California. May–July.

Ozomelis anomala (Piper) Rydb. N. Amer. Fl. 22: 96. 1905. (*Mitella anomala* Piper, Erythea 7: 162. 1899.) Apparently an aberrant form, possibly of *Ozomelis trifida*, in which the petals are wanting and some of the stamens modified into staminodia. It is known only from the type collection in the mountains near Yreka, Siskiyou County, California.

19. ÉLMERA Rydb. N. Amer. Fl. 22: 97. 1905.

Low, glandular-pubescent perennials with thick scaly rootstocks and lateral leafy flowering branches. Cauline leaves with conspicuous membranous stipules. Inflorescence racemose. Hypanthium deeply campanulate, adnate to the lower half of the ovary. Sepals 5, ovate, erect. Petals 5, spatulate, erect, 3–5-cleft at the apex or entire. Stamens 5, opposite the sepals; filaments very short. Ovary 1-celled, half inferior, with two parietal many-ovuled placentae; style filiform but short. Capsule opening between the two short divergent beaks. [Dedicated to A. D. E. Elmer, a contemporary American botanist.]

A monotypic genus confined to the mountains of western Washington and adjacent British Columbia.

1. *Elmera racemosa* (S. Wats.) Rydb. *Elmera*. Fig. 2289.

Heuchera racemosa S. Wats. Proc. Amer. Acad. 20: 365. 1885.

Tellina racemosa Greene, Erythea 3: 55. 1895.

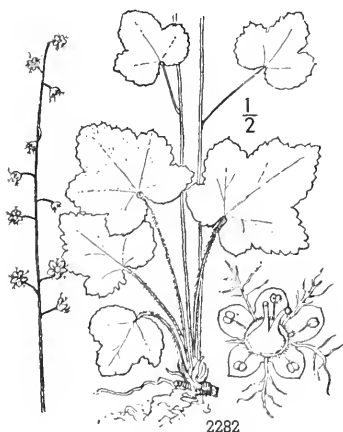
Elmera racemosa Rydb. N. Amer. Fl. 22: 97. 1905.

More or less glandular-hispid perennial from a densely scaly rhizome. Basal leaves round-reniform, crenate and slightly round-lobed, 2–4 cm. broad, sparsely glandular-hirsute on the upper side, more conspicuously so on the veins beneath; petioles 2–7 cm. long, glandular-hirsute; leaves of the flowering shoots 1–4, alternate, with conspicuous reddish-brown scarious stipules, otherwise similar to the basal leaves, the lower quite as large; rachis of the raceme as well as the pedicels and base of the hypanthium densely glandular; hypanthium urceolate-campanulate, 4–6 cm. long, yellowish green; sepals widely ovate, obtuse; petals yellowish white, spatulate in outline, more or less toothed or lacinate or entire, very short-clawed or sessile, acute, slightly exceeding the sepals.

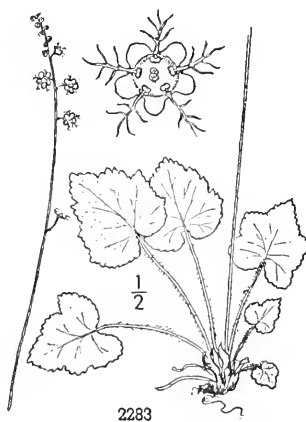
Crevices of rocks and rock talus, Arctic-Alpine Zone; Olympic and Cascade Mountains of Washington and in the mountains of adjacent British Columbia. Type locality: Mount Adams, Washington, at 7,000–8,000 feet altitude. Aug.

20. HEÛCHERA L. Sp. Pl. 226. 1753.

Perennials with mostly basal, long-petioled, palmately veined leaves and lateral scapiform or leafy flowering stems from a scaly rootstock. Inflorescence paniculate, diffusely branching to contracted and spike-like. Hypanthium most often campanulate, but varying



2282. *Mitellastra caulescens*



2283. *Pectiantia pentandra*



2284. *Pectiantia Breweri*

to urceolate, cylindric, hemispheric, turbinate and saucer-shaped, adnate to the lower part of the ovary. Sepals 5, widely ovate to oblong and triangular, erect or spreading, often unequal. Petals small, entire, obovate to spatulate, oblanceolate or linear, usually more or less clawed, sometimes early deciduous or wanting. Stamens 5, opposite the sepals, included or exserted; anthers 2-celled; filaments most often filiform. Ovary approximately half inferior, 1-celled with 2 parietal many-ovuled placentae; capsule-valves normally 2, distinct, usually elongated, capped by the true styles, these sometimes almost or quite wanting. Stigmas inconspicuous to broadly capitate. Capsule opening between and along the more or less divergent beaks. [Named for Johann Heinrich von Heucher, 1677–1747, a German professor of medical botany.]

A genus of about 50 species, natives of North America, from Hudson Bay and Bering Sea to southern Mexico. Type species, *Heuchera americana* L.

Stamens equaling or exceeding the sepals (except *brevistaminea*); hypanthium tube longer than the sepals.

Hypanthium nearly or quite regular, pale, greenish or whitish, rarely tinged with pink or purple.

Hypanthium rounded at base and hemispheric, copiously pilose.

1. *H. pilosissima*.

Hypanthium acute or acutish at base, turbinate, moderately villous.

Panicle becoming diffuse; hypanthium 1.5–3 mm. long.

Leaves acutely lobed and toothed; seeds with relatively long spine-like processes.

2. *H. glabra*.

Leaves at least the basal with rounded lobes; seeds with the spines very short or obsolete.

3. *H. micrantha*.

Panicle thyrsoid, more or less dense; hypanthium 3.5–5 mm. long.

4. *H. maxima*.

Hypanthium oblique at apex, rose-purple; deeply campanulate or urceolate.

Styles very slender, well-exserted; stamens well-exserted; petals linear or very narrowly oblanceolate, less than 0.5 mm. wide, shorter than the stamens.

5. *H. rubescens*.

Styles stouter, included; stamens about equaling the sepals or (in *brevistaminea*) much shorter; petals broadly spatulate, 0.5–1 mm. wide, well exceeding the sepals.

Stamens about equaling the sepals.

6. *H. elegans*.

Stamens very short, barely reaching the base of the sepals.

7. *H. brevistaminea*.

Stamens included, shorter than the sepals; hypanthium pale greenish or yellowish.

Hypanthium deeply campanulate to urceolate; panicle spiciform to subcapitate.

Flowering branches and petioles hirsute or glandular-pubescent.

Flowers yellowish; leaves more or less thick and rigid.

Leaves glabrous or hairy only on the veins, shining, 3–6 cm. wide, with a sinus at the base.

8. *H. cylindrica*.

Leaves, at least the youngest, more or less densely glandular-puberulent, 1–4 cm. wide, rarely with a basal sinus.

9. *H. ovalifolia*.

Flowers greenish; leaves neither thick nor rigid; flowering stems and petioles conspicuously hirsute.

10. *H. chlorantha*.

Flowering branches and petioles glabrous or merely finely puberulent.

Flowers yellowish; leaves firm and more or less coriaceous, shining.

11. *H. glabella*.

Flowers greenish; leaves thin, neither at all coriaceous nor shining.

12. *H. tenuifolia*.

Hypanthium broadly turbinate, 2.5–5 mm. long; panicle narrow but not spiciform; petals elliptic-oblong, acute and mostly acuminate.

13. *H. Duranii*.

1. *Heuchera pilosissima* Fisch. & Mey. Seaside *Heuchera*. Fig. 2290.

Heuchera pilosissima Fisch. & Mey. Ind. Sem. Hort. Petrop. 5: 36. 1838.

Heuchera hispida Hook. & Arn. Bot. Beechey 347. 1838. Not Pursh, 1814.

Heuchera hirtiflora Torr. & Gray, Fl. N. Amer. 1: 582. 1840.

Heuchera hemisphaerica Rydb. N. Amer. Fl. 22: 112. 1905.

Heuchera pilosella Rydb. loc. cit.

Acaulescent or sometimes short-stemmed, flowering branches often more than one, scapiform or leafy, relatively thick, 2–6 dm. high, densely villous-hirsute with brownish gland-tipped hairs. Basal leaves thick and often subcoriaceous, 4–7 cm. wide, cordate to rounded-cordate, with mostly rounded lobes and somewhat doubly dentate with ovate apiculate teeth, obtuse or acutish at the apex, hirsute on both sides, the hairs on the margin gland-tipped; petioles 8–10 cm. long, densely covered with long glandular hairs; cauline leaves similar though smaller and shorter-petioled, often much reduced; inflorescence relatively narrow, with the exception of the flowers densely glandular, the cymules often very much contracted; hypanthium hemispheric or at least rounded at the base, yellowish, often pink-tinged, densely pilose, including the rounded or acutish sepals 3–4 mm. long; petals oblong-elliptic with a narrow claw, longer than the sepals; stamens exserted.

Ocean bluffs and terraces, Humid Transition Zone; Humboldt County to San Luis Obispo County, California. Type locality: probably Bodega Bay, Sonoma County, California. April–July.

Heuchera Mérimii Eastw. Bull. Torrey Club 32: 199. 1905. Flowering branches several, short, 2 dm. high or less, often bearing a small leaf at base. Basal leaves orbicular to ovate, truncate at base, 2–3 cm. wide, their petioles 1–4 cm. long, glandular-hirsute; panicle contracted, glandular-puberulent; hypanthium hemispheric, together with the sepals 3–4 mm. long. Apparently confined to the Salmon Mountain region of Trinity and Siskiyou Counties, California. Type locality: Canyon Creek, Trinity County, California.

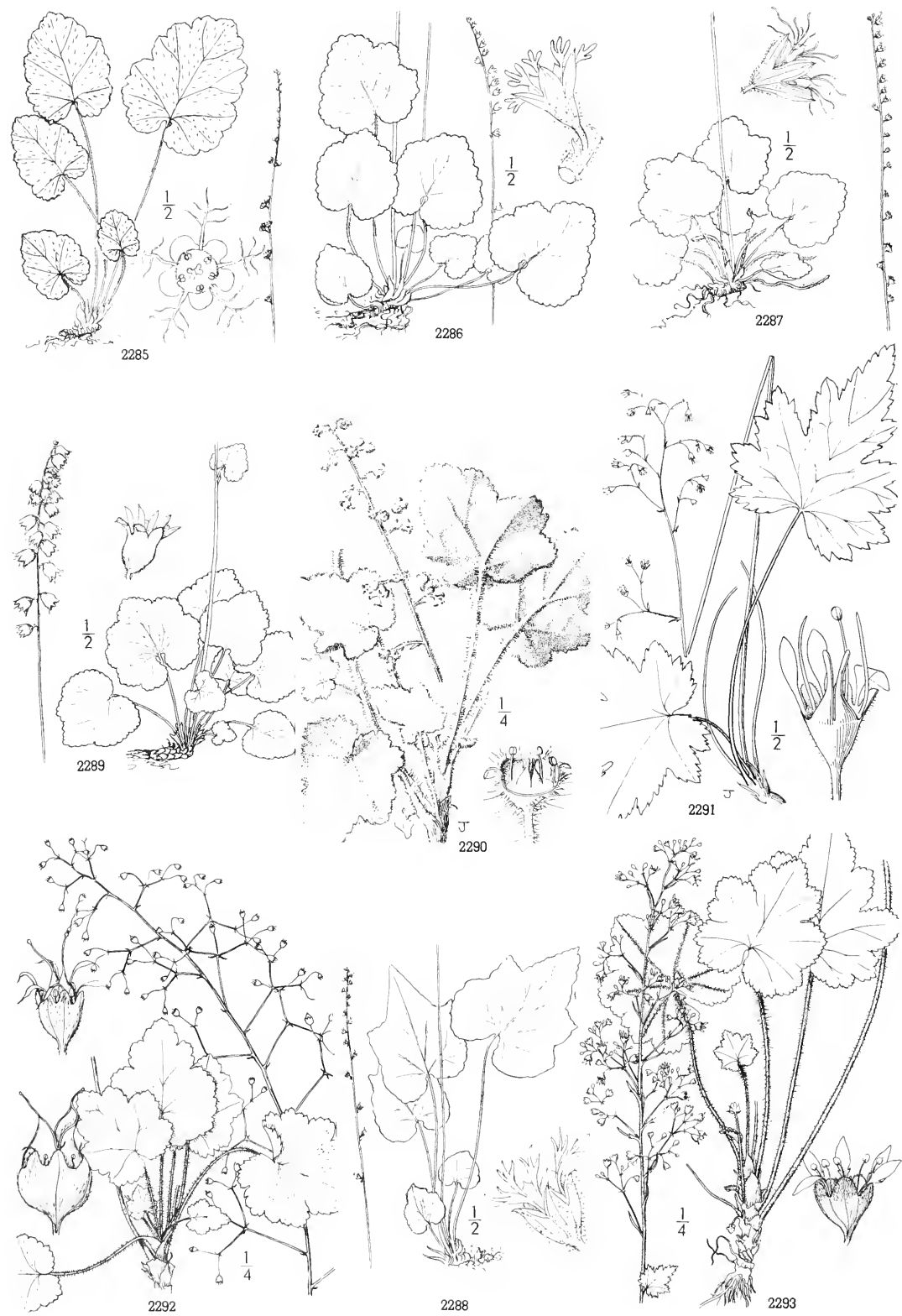
2. *Heuchera glabra* Willd. Alpine *Heuchera*. Fig. 2291.

Heuchera glabra Willd. ex Roem. & Sch. Syst. Veg. 6: 216. 1820.

Tiarella colorans Graham, Edinb. New Phil. Journ. 7: 349. 1829.

Heuchera divaricata Fisch. ex Ser. in DC. Prod. 4: 51. 1830.

Flowering branches slender, erect or curved, 1–6 dm. high, glabrous, occasionally leafless, more usually bearing 1–3 petiolate leaves, the smaller upper ones often subtending the lower



2285. *Pectiantia ovalis*
2286. *Ozomelis trifida*
2287. *Ozomelis stauropetala*

2288. *Ozomelis diversifolia*
2289. *Elmera racemosa*
2290. *Heuchera pilosissima*

2291. *Heuchera glabra*
2292. *Heuchera micrantha*
2293. *Heuchera maxima*

branches of the panicle. Basal leaves with a cordate base, ovate to rounded in outline, deeply and acutely 5-7-lobed, sparingly hirsutulous and hispid-ciliate when young, soon entirely glabrous, very thin, shining above, 3-10 cm. wide and as long or slightly longer; lobes triangular-ovate, the terminal one sometimes narrower, acute, doubly and sharply serrate, the serrations often apiculate; petioles 6-20 cm. long, slender, glabrous; cauline leaves similar, the upper smaller and shorter-petioled; panicle lax, 5-20 cm. long, ovate-oblong in outline, moderately glandular-puberulent; hypanthium turbinate-campanulate, puberulent, with the sepals 2.5-3 mm. long; petals white, broadly spatulate or oval with very slender claws, acute or obtusish, about twice the length of the sepals; capsule and beaks at length much exserted, 6-8 mm. long.

Damp shady rocks and cliffs, Canadian and Hudsonian Zones; subarctic British America and Alaska southward in the Cascade Mountains to central Oregon; also in the Olympic Mountains of Washington. Type locality: "West Coast of North America." July-Sept.

3. *Heuchera micrantha* Dougl. Small-flowered *Heuchera* or Alum Root. Fig. 2292.

Heuchera micrantha Dougl. Bot. Reg. pl. 1302. 1830.

Heuchera barbarossa Presl, Rel. Haenk. 2: 56. 1831.

Heuchera Hartwegii (S. Wats.) Rydb. N. Amer. Fl. 22: 102. 1905.

Heuchera diversifolia Rydb. loc. cit.

Heuchera glaberrima Rydb. op. cit. 22: 103.

Heuchera Nuttallii Rydb. loc. cit.

Heuchera Lloydii Rydb. op. cit. 22: 113.

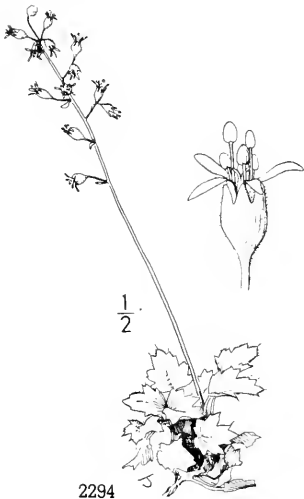
Flowering branches 1-4-leaved or scapiform, usually stoutish, 3-7 dm. high, more or less hirsute with whitish or brownish hairs, at least below. Basal leaves round- to ovate-cordate, acute or obtuse at apex, 4-10 cm. long, mostly incised, the lobes rounded and dentate with broadly ovate, cuspidate teeth, sparingly short-hirsute on both sides to glabrate above, conspicuously long-hairy on the veins beneath, especially toward the base; petioles 8-15 cm. long, usually densely villous-hirsute; cauline leaves smaller, usually more acutely lobed and with more evident stipules; inflorescence usually an ample and diffuse panicle; pedicels and rachis usually finely glandular-puberulent; bracts linear, or the lower with linear-lanceolate attenuate teeth; hypanthium short-campanulate, turbinate at the base, appressed-pilose, including the ovate, obtuse sepals 1.5-2.5 mm. long, much shorter than the filiform pedicels; petals oblanceolate or narrower, whitish, two to two and one-half times as long as the sepals.

Woods and ravines, Humid and Arid Transition Zones; Vancouver Island, southern British Columbia, and northern Idaho, southward west of the Cascade Mountains to Tulare County in the Sierra Nevada and San Luis Obispo County in the Coast Ranges, California. Type locality: near the Grand Rapids of the Columbia River. May-July. Variable as to pubescence and leaf-margins and several varieties have been proposed.

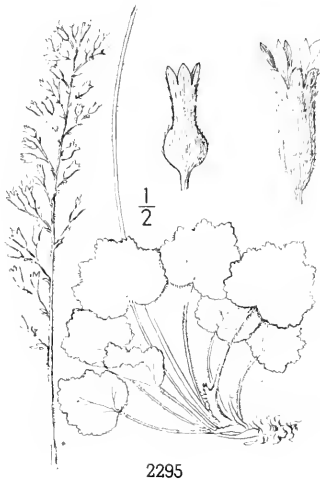
4. *Heuchera máxima* Greene. Island *Heuchera*. Fig. 2293.

Heuchera maxima Greene, Bull. Calif. Acad. 2: 149. 1886.

Caulescent perennial, the stout fleshy often decumbent stem sometimes branched and 2-6 dm. long, or ascending and 0.5-1.5 dm. high, densely clothed with the stipular-expanded fimbriate-ciliate petiole-bases. Flowering branches often very stout, 3-6 dm. tall, often bearing 3 or 4 ample leaves, densely hirsute, glandular above; petioles 8-18 cm. long, densely hirsute; leaf-blades orbicular- to ovate-cordate, the basal sinus usually very deep, 4-15 cm. in diameter or 7-9 cm. wide and 9-12 cm. long, the lobes narrowly to broadly ovate, rounded, crenate-dentate to serrate, bristle-tipped and ciliolate, glabrous above, hirsute on the veins beneath; inflorescence relatively dense, elongated and narrowly thyrsoid, 6-30 cm. long; hypanthium densely glandular-



2294. *Heuchera rubescens*



2295. *Heuchera elegans*



2296. *Heuchera brevistaminea*

puberulent below, the rounded-ovate obtuse sepals often densely pilose; petals narrowly spatulate, white, somewhat exceeding the sepals.

Sea cliffs and canyon walls, Upper Sonoran Zone; Santa Rosa, Santa Cruz, and Anacapa Islands, off the coast of southern California. Type locality: northward slope of Santa Cruz Island. Feb.-May.

5. *Heuchera rubescens* Torr. Pink Heuchera. Fig. 2294.

Heuchera rubescens Torr. in Stansbury's Exp. 388. 1852.

Heuchera rubescens var. *oregonensis* Wheelock, Bull. Torrey Club 17: 197. 1890.

Heuchera caespitosa Eastw. Proc. Calif. Acad. II, 6: 426. 1896.

Heuchera cuneata Howell, Fl. N.W. Amer. 203. 1898.

Heuchera lithophila Heller, Muhlenbergia 1: 105. 1904.

Heuchera Pringlei Rydb. N. Amer. Fl. 22: 111. 1905.

Acaulescent; scapes more or less hirsute below or mostly glabrous, shining, 2-4 dm. high, naked or bearing several variously laciniate scarious bractlets, these rarely bearing a very much reduced or even a normal leaf in their axils. Basal leaves broadly ovate to reniform, truncate to cordate at the base, glabrous to sparingly hirsute above, especially on the veins, often more or less hirsute on the veins beneath, 2-6 cm. broad, round-lobed and with rounded-ovate, ciliate and bristle-pointed teeth; petioles glabrous to more or less hirsute, 2-7 cm. long; hypanthium narrowly campanulate, pinkish, glandular-puberulent and more or less white-hairy, including the oblong, obtuse and green-tipped sepals 4-6 mm. long; petals linear-oblongate, twice the length of the sepals; stamens as long as or slightly longer than the petals.

Rocky places in the mountains, Arid Transition to Hudsonian Zones; Utah south to eastern Texas and west to southeastern Oregon, the Salmon Mountains, Sierra Nevada, and Cuyamaca Mountains of California. Type locality: Stansbury's Island, Great Salt Lake, Utah. June-Aug. A variable species especially in pubescence; several species and varieties have been proposed.

6. *Heuchera elegans* Abrams. Urn-flowered Heuchera. Fig. 2295.

Heuchera elegans Abrams, Bull. S. Calif. Acad. 1: 67. 1902.

Heuchera Abramsii Rydb. N. Amer. Fl. 22: 109. 1905.

Heuchera hirsutissima Rosend. Butt. & Lak. Minn. Stud. Pl. Sci. 2: 110. 1936.

Acaulescent and densely caespitose, flowering branches bracteate, sometimes bearing 1-3 much reduced stipulate leaves, 1-4 dm. high, minutely glandular and villous-hirsute to puberulent. Basal leaves thickish, rounded or round-ovate, more usually truncate or open-cordate at the base, 1-3 cm. broad, crenately lobed and toothed, glabrous or sparsely pubescent, the margins markedly ciliate; teeth ovate-crenate, mucronate and bristle-tipped; petioles sparingly to densely hirsute, 2-7 cm. long; panicles narrow, glandular-pubescent throughout, the short branches cymose; bracts more or less scarious, fimbriate, 4 mm. or less long; hypanthium buff-purple to bright pink, sparingly to densely white-pilose, densely glandular at the base, cylindric, in age urceolate, including the oblong and often green-tipped sepals 7-8 mm. long; petals white, lanceolate-spatulate, slightly longer than to two and a half times the length of the sepals, narrowed to a slender claw; stamens scarcely exerted.

Rocky places, Upper Sonoran and Arid Transition Zones; mountains of southern California, chiefly in the San Gabriel Range. Type locality: near the summit of Mount Wilson, Los Angeles County, California. April-June.

7. *Heuchera brevistaminea* Wiggins. Laguna Heuchera. Fig. 2296.

Heuchera brevistaminea Wiggins, Contr. Dudley Herb. 1: 100. 1929.

Flowering stems 2-3 dm. high, from a short woody caudex. Basal leaves cordate-orbicular, shallowly 5-lobed, the lobes shallowly 2-3-toothed, ciliate on the margins, punctate-glandular above, sparsely hirsute on the veins beneath; petioles glandular-puberulent and hirsute; inflorescence narrowly paniculate, glandular-pubescent; hypanthium campanulate, 3-4 mm. long, deep rose-purple; sepals ovate, 1-1.5 mm. long, glandular-puberulent; petals broadly spatulate, 4-5 mm. long, much surpassing the sepals, sparsely pubescent on the back; stamens inserted below the middle of the hypanthium, very short, scarcely reaching the sinuses of the sepals; styles about equaling the stamens.

Rocky slopes, Upper Sonoran and lower part of Arid Transition Zones; Laguna Mountains, San Diego County, California. July-Sept.

8. *Heuchera cylindrica* Dougl. Cylindrical Heuchera. Fig. 2297.

Heuchera cylindrica Dougl. ex Hook. Fl. Bor. Amer. 1: 236. 1834.

Yamala cylindrica Raf. Fl. Tell. 2: 75. 1836.

Holochloa elata Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 580, as a synonym. 1840.

Holochloa cylindrica Nutt. loc. cit., as a synonym.

Heuchera columbiana Rydb. N. Amer. Fl. 22: 116. 1905.

Acaulescent; flowering branches scapiform, stoutish, rather densely hirsute with white hairs, 3-5 dm. high, bearing 2 or 3 minute scarious bracts; petioles 3-10 cm. long, hirsute; leaves orbicular or slightly narrower, deeply cordate at the base, glabrous or ciliate on the margins and veins, stiff and somewhat subcoriaceous, shining, 3-6 cm. wide, round-lobed and crenate; inflorescence elongated, spike-like, 5-10 cm. long; flowers subtended by rather large, oblong-triangular, long-ciliate and foliaceous bracts; hypanthium deeply campanulate, yellowish, densely short-hirsute below, including the oblong, obtuse or acute sepals about 8 mm. long; petals mostly wanting.

Rocky places, Arid Transition Zone; southern British Columbia, eastern Washington and Oregon across Idaho to Montana. Type locality: "West side of the Rocky Mountains." May-June.

9. *Heuchera ovalifolia* Nutt. Oval-leaved Heuchera. Fig. 2298.

Heuchera ovalifolia Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 581. 1840.

Heuchera cylindrica var. *alpina* S. Wats. Bot. King Expl. 94. 1871.

Heuchera cylindrica var. *ovalifolia* Wheelock, Bull. Torrey Club 17: 203. 1890.

Heuchera alpina Blankinship, Mont. Agr. Coll. Sci. Stud. 1: 62. 1905.

Heuchera Suksdorfii Rydb. N. Amer. Fl. 22: 116. 1905.

Densely caespitose from a stout creeping rhizome; flowering branches leafless, densely glandular-pubescent with short hairs, bearing one to several triangular-subulate, glandular-ciliate, scarious bracts, 8–30 cm. high. Leaves all basal, rounded-oval, 1–4 cm. broad, about as long as or slightly longer than broad, truncate or rounded, or rarely very slightly cordate at the base, crenately to more deeply lobed, with rounded or slightly acuminate and mucronate teeth, or merely deeply and doubly crenate-serrate, thickish, at least the youngest more or less glandular-puberulent; petioles 3–10 cm. long, densely glandular-puberulent; inflorescence dense, often subcapitate, 1–6 cm. long; hypanthium deeply campanulate, yellowish, densely short-hirsute and glandular, with the broadly oblong, acute or obtuse sepals 5–7 mm. long; petals usually absent.

Rocky banks and hillsides, Arid Transition to Hudsonian Zones; Alberta and British Columbia to Wyoming and south through Washington and eastern Oregon to northern Nevada and northeastern California. Type locality: Blue Mountains, Oregon. May–July.

10. *Heuchera chlorantha* Piper. Green-flowered Heuchera. Fig. 2299.

Heuchera chlorantha Piper, Contr. U.S. Nat. Herb. 16: 206. 1913.

Cespitose from a stout rhizome; flowering stems leafless, naked or with one or two minute fimbriate bracts, villous, 5–8 dm. high. Leaves all basal, orbicular to slightly reniform, rather deeply cordate at base, 4–8 cm. broad, crenately 7–9-lobed, the lobes with broad cuspidate teeth, glabrous except on the veins beneath; petioles 5–20 cm. long, conspicuously villous with irregularly spreading or somewhat retrorse, usually brownish hairs; inflorescence a dense narrow panicle, 5–10 cm. long, glandular-pubescent; flowers subtended by relatively large ovate to lanceolate foliaceous fimbriate bracts; hypanthium greenish, deeply urceolate-campanulate, pruinose-puberulent, with the oblong sepals 6–8 mm. long, lengthening in fruit; petals minute or lacking.

In damp meadows, Humid Transition Zone; British Columbia east to Idaho and southward through western Washington to southern Oregon. Type locality: Falcon Valley, Klickitat County, Washington. June–July.

11. *Heuchera glabella* Torr. & Gray. Smooth Heuchera. Fig. 2300.

Heuchera glabella Torr. & Gray, Fl. N. Amer. 1: 581. 1840.

Holochloa glabella Nutt. ex Torr. & Gray, Fl. N. Amer. loc. cit., as a synonym.

Heuchera cylindrica var. *glabella* Wheelock, Bull. Torrey Club 17: 203. 1890.

Usually densely caespitose from a thick woody rhizome; flowering branches leafless, 2.5–6 dm. high, finely puberulent or glabrous, usually with several minute scarious bracts. Leaves all basal, shining, firm and somewhat coriaceous in texture, rounded-oval or orbicular, slightly cordate or truncate at the base, 2–5 cm. wide and as long or slightly longer, glabrous or minutely glandular-puberulent, short-ciliate, round-lobed and with crenate mucronate teeth; petioles 3–10 cm. long, finely puberulent or glabrous; inflorescence narrow, sometimes almost subcapitate, 3–25 cm. long; hypanthium deeply campanulate, including the broadly oblong sepals 5–8 mm. long; petals usually none.

Rocky hills, Arid Transition Zone; Alberta to Montana and British Columbia south through Idaho, eastern Washington to northeastern Oregon. Type locality: "Rocky Mountains towards the Oregon." June–Aug.

12. *Heuchera tenuifolia* (Wheelock) Rydb. Thin-leaved Heuchera. Fig. 2301.

Heuchera cylindrica var. *tenuifolia* Wheelock, Bull. Torrey Club 17: 204. 1890.

Heuchera tenuifolia Rydb. N. Amer. Fl. 22: 116. 1905.

Acaulescent; flowering branches glabrous or minutely glandular-puberulent, 4–6 dm. high, naked or bearing one or two small scarious bracts. Leaves reniform or rounded-oval, distinctly cordate at the base, thin, mostly entirely glabrous, shallowly round-lobed and crenate, with broad, rounded, ciliate and bristle-tipped teeth; petioles slender, 5–15 cm. long, glabrous or minutely glandular-puberulent; inflorescence spiciform; hypanthium deeply campanulate, minutely glandular-puberulent, greenish, yellowish toward the sepals, including these about 6 mm. long; petals oblanceolate, one-half to two-thirds as long as the sepals, or none.

Hillsides, mostly Arid Transition Zone; British Columbia south to northern Oregon and east to Idaho. Type locality: near The Dalles, Oregon. May–July.

Heuchera Cusickii Rosend. Butt. & Lak. Minn. Stud. Pl. Sci. 2: 157. 1936. Flowering stems from a subrhizomatous caudex, 15–30 cm. high, scapiform. Leaves all basal, cordate-orbicular or broadly ovate, 10–25 mm. broad, 5–7-lobed, the lobes broadly ovate or obovate, dentate, the teeth aristate, glabrous; petioles slender, 1–5 cm. long, glabrous or glandular-puberulent; inflorescence a short dense spike-like or subcapitate panicle; hypanthium short-campanulate, 3.5–4 mm. long, glandular-puberulent; sepals unequal, about 1.5 mm. long; petals about equaling the sepals, oblanceolate to spatulate; stamens short. Known only from the type collection, made "5 miles west of Imnaha, Wallowa County, Oregon."

13. *Heuchera Duranii* Bacigalupi. Duran's Heuchera. Fig. 2302.

Heuchera Duranii Bacigalupi, Contr. Dudley Herb. 1: 191. 1933.

Acaulescent and caespitose from a relatively stout ascendingly branched perennial caudex; flowering stems one or two from a caudex-branch, slender, glandular-puberulent, 1.5–3 dm. tall, bearing a pinkish hyaline linear-spatulate fimbriolate-ciliolate bractlet. Leaves reniform, the smaller suborbicular, dull gray-green, crenately lobed and toothed, ciliolate, densely glandular-puberulent, 8–18 mm. broad; petioles slender, glandular-puberulent, 1.5–2.5 cm. long; panicle very narrow, glandular-puberulent, 4–8 cm. long; bractlets subtending the hypanthium similar to

those of the scape; hypanthium minutely glandular-puberulent, broadly turbinate, yellow with a broad band of light brown above the middle, including the broadly triangular acute to obtuse sepals 2.5–3 mm. long, in fruit becoming rounded at the base and greenish; petals little exceeding the sepals, cream-colored, elliptic-oblong, mostly acuminate, the claw relatively broad; stamens not exceeding the sepals; styles short, ultimately exceeding the sepals by 0.5–1 mm.

Rocky situations, Boreal Zones; White Mountains of eastern California. Type locality: McAfee Meadow, White Mountains, Mono County, California.

Family 60. HYDRANGEACEAE.

HYDRANGAEA FAMILY.

Trees, shrubs, or vines with simple opposite exstipulate leaves. Flowers corymbose, racemose or rarely solitary, perfect or the outer ones of the cluster sometimes sterile. Hypanthium adnate to the ovary. Sepals and petals usually 5, sometimes fewer. Stamens twice as many as the petals or more numerous. Ovary compound, at least the lower half adnate to the hypanthium; carpels 2–10, wholly united or free at the apex. Seeds numerous; embryo small; endosperm copious.

About 16 genera and 80 species, natives of temperate and tropical regions.

Capsule beaked by the persistent styles; ovules several to many in each cell, only 1 maturing in *Fendlerella*.

Styles more or less united; flowers showy.

Leaves deciduous, often toothed; styles partly united.

Leaves evergreen, coriaceous, entire; styles completely united.

Styles distinct; capsule conical.

Leaves toothed, small; stigma terminal; flowers showy.

Leaves entire, small; stigma partially introrse; flowers small.

Capsule depressed-globose, beakless; styles distinct, deciduous; ovules solitary in each cell; flowers minute.

1. *Philadelphus*.

2. *Carpenteria*.

3. *Jamesia*.

4. *Fendlerella*.

5. *Whipplea*.

1. PHILADELPHUS L. Sp. Pl. 470. 1753.

Branching shrub with deciduous, entire or toothed, usually petioled leaves. Flowers perfect, usually showy and often fragrant, borne solitary or in few-flowered cymes at the ends of short branchlets, often so grouped as to appear racemose or paniculate. Sepals 4 or rarely 5, valvate, persistent. Petals 4 or 5, showy, white or ochroleucous, convolute. Stamens usually numerous; filaments subulate, free or united below; anthers short. Ovary adnate to the hypanthium for at least two-thirds its length, 4-celled, or rarely 3- or 5-celled; styles elongated or short, more or less united. Ovules numerous, pendulous in several series. Capsule obovoid, firm, loculicidal; seeds numerous, with a membranous testa; endosperm none. [Named after King Ptolemy Philadelphus.]

A genus of about 45 species, natives of north temperate regions. Type species, *Philadelphus coronarius* L.

Leaves 2.5–8 cm. long; flower clusters racemose or paniculate, 4–20-flowered; calyx glabrous or nearly so without.

Leaves pubescent all over beneath, usually dentate; styles united for two-thirds their length.

Leaves pubescent only on the nerves beneath, entire or denticulate.

Styles united to the middle or only a little beyond.

Styles united up to the stigmas.

Leaves 0.5–2 cm. long; flower clusters cymose, mostly 1–3-flowered; calyx silky-tomentose without.

1. *P. Gordonianus*.

2. *P. Lewisii*.

3. *P. californicus*.

4. *P. serpyllifolius*.

1. *Philadelphus Gordonianus* Lindl. Gordon's Syringa. Fig. 2303.

Philadelphus Gordonianus Lindl. Bot. Reg. 24: Misc. 21. 1838.

Philadelphus columbianus Koehne, Gartenfl. 1896: 542. 1896.

Philadelphus angustifolius Rydb. N. Amer. Fl. 22: 166. 1905.

Philadelphus platyphyllus Rydb. N. Amer. Fl. 22: 167. 1905.

Deciduous shrub, 2–4 m. high, with ascending branches. Leaves ovate, 3–8 cm. long, short-acuminate, obtuse or on vigorous shoots subcordate at base, usually dentate, rarely sparsely denticulate, more or less pubescent on both surfaces; racemose flower clusters 5–10-flowered; petals oblong to oval, 15–20 mm. long; styles united half to two-thirds their length; capsule ovoid, 8–10 mm. long.

Hillsides and stream banks, mainly Humid Transition Zone; British Columbia, southward west of the Cascades to Shasta and Humboldt Counties, California. Type locality: Northwest America, collected by Douglas. May–July.

2. *Philadelphus Lewisii* Pursh. Lewis' Syringa. Fig. 2304.

Philadelphus Lewisii Pursh, Fl. Amer. Sept. 329. 1814.

Philadelphus confusus Piper, Bull. Torrey Club 29: 225. 1902.

Philadelphus Helleri Rydb. N. Amer. Fl. 22: 166. 1905.

Deciduous shrub, 1–2.5 m. high, with ascending branches, the bark of the previous season usually with numerous cross cracks and eventually exfoliating. Leaves ovate or ovate-lanceolate, 2–5 cm. long, acute at apex, obtuse or acute at base, entire or denticulate, glabrous or sparingly

hairy on the veins beneath and in the forks of the principal veins near the base; flower clusters racemose; petals elliptic to oval, 10–15 mm. long; styles united half to two-thirds the way.

Hillsides and canyons, Arid Transition Zone; British Columbia east of the Cascade Mountains to eastern Oregon, eastward to central Montana. Type locality: Clark's Fork of the Columbia River, Montana. May–July.

3. *Philadelphus californicus* Benth. California Syringa. Fig. 2305.

Philadelphus californicus Benth. Pl. Hartw. 309. 1849.

Philadelphus Lewisii var. *californicus* A. Gray, Bot. Calif. 1: 202. 1876.

Philadelphus Fremontii Rydb. N. Amer. Fl. 22: 165. 1905.

Deciduous shrub, 1.5–3 m. high, with ascending branches. Leaves ovate or ovate-lanceolate, 3–6 cm. long, acute at apex and base, entire or inconspicuously denticulate; flower clusters racemose, 7–20-flowered; petals oval to obovate, 10–12 mm. long; styles united up to the base of the stigmas.

Hillsides and canyons, mainly Arid Transition Zone; Siskiyou Mountains, southern Oregon, to the central Sierra Nevada, California. Type locality: western slopes of the Sierra Nevada, probably along the American River or in Butte County, California. May–July.

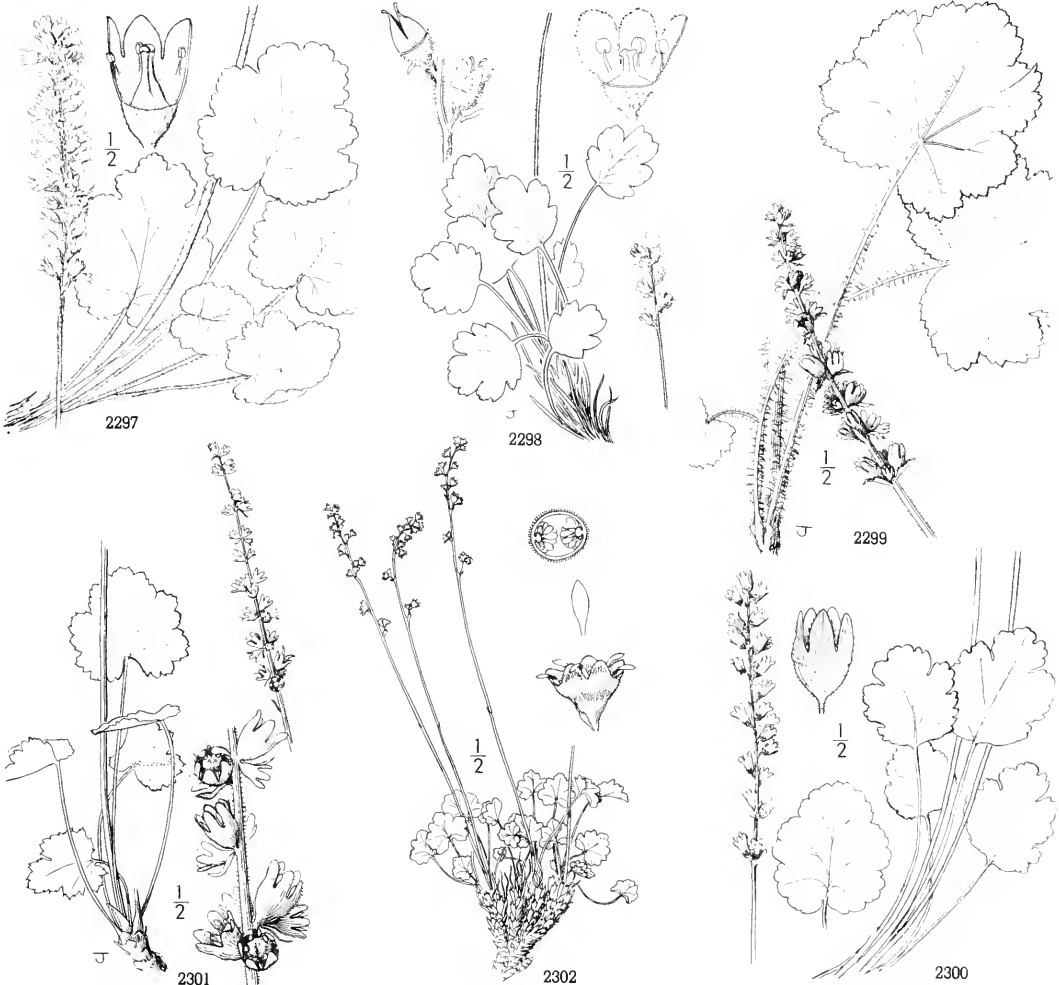
4. *Philadelphus serpyllifolius* A. Gray. Desert Syringa. Fig. 2306.

Philadelphus serpyllifolius A. Gray, Pl. Wright. 1: 77. 1852.

Philadelphus stramineus Rydb. N. Amer. Fl. 22: 172. 1905.

Philadelphus pumilus Rydb. N. Amer. Fl. 22: 173. 1905.

Deciduous shrub, 6–10 dm. high, with numerous short subspinose branches, the bark pale gray or stramineous. Leaves narrowly ovate to elliptic or elliptic-lanceolate, 8–15 mm. long, strigose-hirsute above, densely white-tomentulose and strigose beneath, mainly 1-nerved, the lateral veins obscure; flowers mostly solitary, on the ends of short divergent branches; calyx



2297. *Heuchera cylindrica*
2298. *Heuchera ovalifolia*

2299. *Heuchera chlorantha*
2300. *Heuchera glabella*

2301. *Heuchera tenuifolia*
2302. *Heuchera Duranii*

hoary-strigose; petals rounded at apex, about 10 mm. long; styles united up to the base of the stigmas.

Rock crevices or dry ridges, Arid Transition Zone; San Jacinto and White Mountains, southeastern California, and San Pedro Martir Mountains, Lower California, east to western Texas. Type locality: western Texas. May-June.

2. *CARPENTÉRIA* Torr. Pl. Frem. 12. 1853.

Shrub, with erect branches and persistent coriaceous leaves. Flowers very showy, in few-flowered cymes. Hypanthium broad and shallow, not enlarged in age, adnate to the base of the capsule. Sepals 5-7, valvate, persistent. Petals 5-7, white, broad, clawless, convolute. Stamens very numerous; filaments filiform. Ovary ovoid, incompletely 5-8-celled; styles completely united, persistent; stigma 5-8-lobed, terminal. Capsule abruptly beaked by the persistent style, firm-coriaceous, loculicidal; seeds numerous. [Name in honor of Professor Carpenter of Louisiana.]

A monotypic genus of California.

1. *Carpenteria californica* Torr. Carpenteria. Fig. 2307.

Carpenteria californica Torr. Pl. Frem. 12. 1853.

Shrubs, 1-2 m. high, the main branches mostly erect, bark light brown and shreddy, young twigs 4-angled, opposite, glabrous or very sparsely pubescent. Leaves leathery, lanceolate, 4-9 cm. long, narrowed to the obtuse apex, and to a short petiole at base, entire, the margin narrowly revolute, dark green and glabrous above, canescent beneath with a strigose and finely tomentulose pubescence; flowers in few-flowered cymes terminating the branches; sepals lanceolate, 10-12 mm. long; petals 5-8, broadly obovate, rounded at apex, rotately spreading; capsule broadly conical or depressed-globose and abruptly beaked, the carpels dehiscing through the beak.

Canyons, Upper Sonoran Zone; foothills of the Sierra Nevada between San Joaquin and Kings Rivers. Type locality: collected by Fremont on his trip up the San Joaquin River. This very local and rare species is becoming a popular ornamental shrub in California gardens. April-June.



2303. *Philadelphus Gordonianus*
2304. *Philadelphus Lewisii*

2305. *Philadelphus californicus*
2306. *Philadelphus serpyllifolius*

2307. *Carpenteria californica*
2308. *Jamesia americana*

3. *JAMESIA* Torr. & Gray, Fl. N. Amer. 1: 593. 1840.

Shrub with erect stems, usually shreddy bark, and deciduous toothed leaves. Flowers showy, perfect, cymose. Hypanthium turbinate to hemispheric, the lobes 5, triangular-ovate to lanceolate. Petals 5, convolute, oblong-ovate, pubescent within. Stamens 10; filaments subulate. Ovary imperfectly 3-5-celled; styles 3-5, distinct; stigmas terminal. Ovules numerous. Capsule about half inferior, conic, beaked by the persistent distinct styles. [Name in honor of Dr. Edwin James, botanist of Long's Expedition to the Rocky Mountains, 1820.]

A monotypic genus of western North America. There is an earlier *Jamesia* (Raf. 1832) but Torrey and Gray's name has been conserved.

1. *Jamesia americana* var. *californica* (Small) Jepson. *Jamesia* or Cliff Bush.
Fig. 2308.

Edwinia californica Small, N. Amer. Fl. 22: 176. 1905.

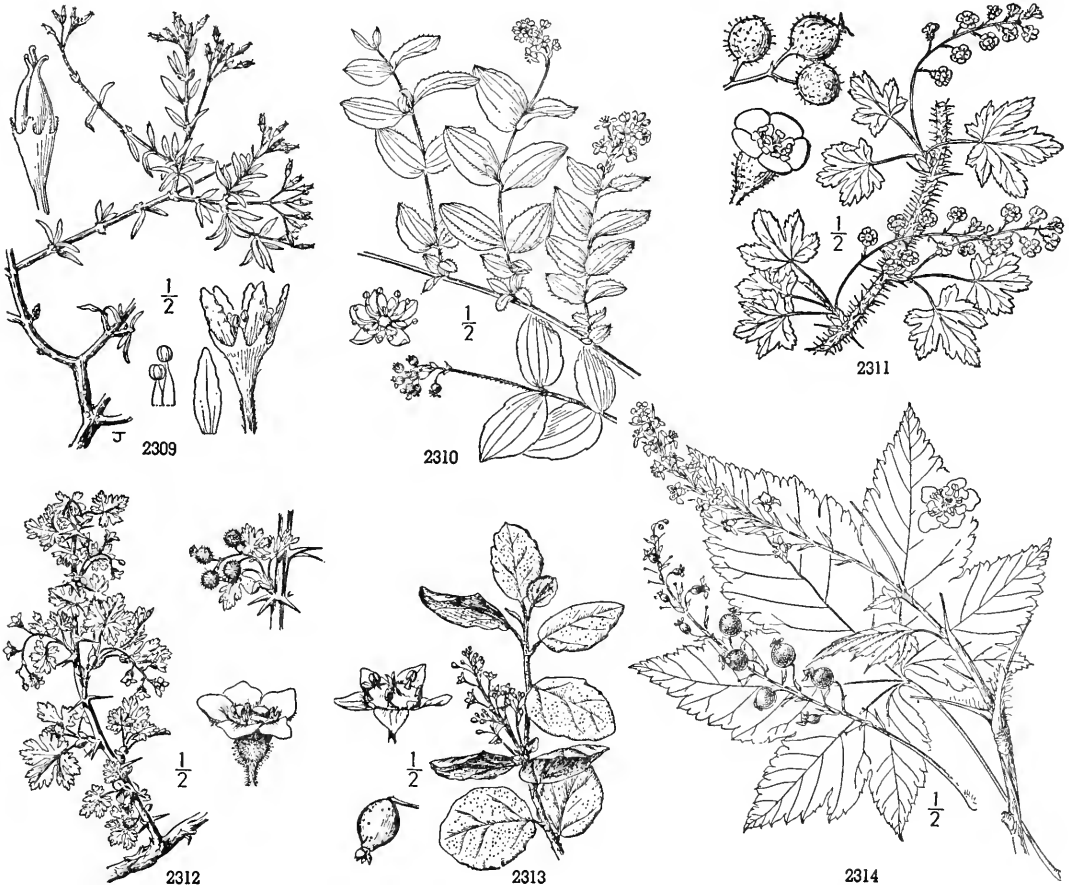
Jamesia americana var. *californica* Jepson, Man. Fl. Pl. Calif. 466. 1925.

Erect much branched shrub, 2-10 dm. high, the bark shreddy, grayish- or reddish-brown, the young twigs strigose or short-villous. Leaves ovate, 15-25 mm. long, prominently crenate-serrate, the teeth mucronulate, lower surface strigose-canescens, the upper sparsely strigose and dark green, lateral veins prominent, impressed on the upper surface; pedicels and hypanthium strigose; sepals triangular-ovate, about 2.5 mm. long; petals 6-7 mm. long, narrowly oblong-ovate; styles elongating after anthesis, becoming twice the length of the calyx.

Rock ledges, Arctic-Alpine Zone; southern Sierra Nevada, from Mono County to Tulare County, also in the Panamint Mountains, California. June-Aug.

4. *FENDLERELLA* Heller, Bull. Torrey Club 25: 626. 1898.

Low or depressed shrub, with shreddy bark. Leaves opposite, small, entire and sub-



2309. *Fendlerella utahensis*
2310. *Whipplea modesta*

2311. *Ribes lacustre*
2312. *Ribes montigenum*

2313. *Ribes viburnifolium*
2314. *Ribes bracteosum*

sessile. Flowers small, perfect, in small dense cymes. Hypanthium turbinate-campanulate, becoming turbinate in fruit. Sepals 5, lanceolate, shorter than the hypanthium. Petals 5, white, oblong or elliptic, narrowed to a broad base. Stamens 10. Ovary conic, 3-celled; styles 3, distinct; ovules several in each cell. Capsule conic, narrow at the base, about half inferior, 3-valved, septicidal. Seeds solitary in each cell. [Name diminutive of *Fendlera*.]

A genus of 3 species, natives of southwestern United States and Mexico. Type species, *Fendlerella utahensis* (S. Wats.) Heller.

1. *Fendlerella utahensis* (S. Wats.) Heller. Yerba Desierto. Fig. 2309.

Whipplea utahensis S. Wats. Amer. Nat. 7: 300. 1873.

Fendlera utahensis Greene, Bull. Torrey Club 8: 26. 1881.

Fendlerella utahensis Heller, Bull. Torrey Club 25: 626. 1898.

Fendlerella cymosa Greene ex Woot. & Standl. Contr. U.S. Nat. Herb. 16: 129. 1913.

Low much branched erect shrub, mostly 4-6 dm. high, with exfoliating bark and strigose young twigs. Leaves numerous, oblong-elliptic to oblong-spatulate, subsessile, 8-25 mm. long, inconspicuously 3-nerved, strigose; cymes terminating leafy branches, several- to many-flowered; sepals 4 mm. long; petals 3-4 mm. long.

Rocky canyons, Upper Sonoran Zone; Clark Mountains, Mojave Desert, California (*Jaeger*), east to Nevada, Utah, Arizona, New Mexico, and western Texas. Type locality: Kanab, Utah. June-Aug.

5. *WHIPPLEA* Torr. Pacif. R. Rep. 4: 90. pl. 7. 1857.

Low spreading or trailing shrub with weak slender branches and at length shreddy bark. Leaves opposite, deciduous, shallowly toothed. Flowers small in short or subcapitate peduncled racemes. Hypanthium broadly turbinate. Sepals 5-6, erect, thin. Petals 5-6, spreading or recurved. Stamens 10 or 12, rarely fewer, alternately longer and shorter; filaments flattened. Ovary globose, 4-5-celled; styles 4-5, distinct, subulate, deciduous; stigmas introrse. Ovule solitary in each cell, pendulous. Capsule globose, separating into 4-5 firm carpels. Seed solitary in each carpel. [Name in honor of Lieut. A. W. Whipple, commander of the Pacific Railroad Expedition in 1853-54.]

A monotypic genus of the Pacific States.

1. *Whipplea modesta* Torr. Yerba de Selva. Fig. 2310.

Whipplea modesta Torr. Pacif. R. Rep. 4: 90. pl. 7. 1857.

Stems more or less branched, reclining or trailing, 3-20 dm. long, finely pubescent when young, the flowering branchlets closely strigose. Leaves ovate to oval, 1-3.5 cm. long, shallowly few-toothed, sessile or subsessile, appressed-pubescent on both surfaces; racemes on slender peduncles terminating the branchlets, 4-9-flowered; pedicels 2-10 mm. long; hypanthium hemispheric; sepals ovate-lanceolate, 1.5-2.5 mm. long; petals white, oblong-ovate, 3 mm. long; capsule globose, 2-2.5 mm. broad.

Wooded slopes, mainly Humid Transition Zone; Olympic Peninsula, Washington, south in the Coast Ranges to Monterey County, California, and inland in the Siskiyou Mountains to Ashland, Oregon. Type locality: red-woods, Marin County, California. March-June. Modesty.

Family 61. GROSSULARIACEAE.*

GOOSEBERRY FAMILY.

Shrubs, with erect, ascending, recurved, or prostrate branches. Leaves alternate, palmately veined and usually lobed, often resinous-glandular or viscid. Stipules when present adnate to the petiole. Flowers racemose or rarely solitary, on 1-2-leaved axillary shoots; pedicels subtended by a bract and usually bearing 2 bractlets. Hypanthium adnate to the globose ovary and more or less produced above it. Sepals 5 or rarely 4; petals as many as sepals, and usually much smaller, erect. Stamens equaling the petals in number, and alternate with them. Ovary 1-celled, with 2 parietal placentae; styles 2, more or less united; stigmas terminal. Fruit a berry crowned with the withering remains of the flower. Seeds several to many; endosperm fleshy; embryo minute, terete.

Two genera and about 120 species, natives of the north temperate zone, and of the Andes in South America. Most abundant in the Pacific States.

Pedicels jointed beneath the ovary; plants without nodal spines, or if with them, the hypanthium obsolete above the ovary.
1. *Ribes*.

Pedicels not jointed; plants with nodal spines; hypanthium always conspicuously produced above the ovary.
2. *Grossularia*.

* Text prepared with the assistance of Frederick V. Coville.

1. *RIBES* L. Sp. Pl. 201. 1753.

Unarmed or rarely bristly shrubs, with palmately veined and usually lobed leaves, deciduous or rarely persistent. Racemes several- to many-flowered; pedicels jointed beneath the ovary, usually with a pair of bractlets just below the joint. Ovary smooth or glandular, not spiny. Free portion of the hypanthium tubular or cup-shaped, often colored, short or elongated, sometimes obsolete. Fruit disarticulating from the pedicel at the joint. [Name from *ribas*, the Arabic name of *Rheum Ribes*.]

A genus of about 60 species, natives of the subarctic and north temperate regions, extending to the Andes, South America. Type species, *Ribes rubrum* L.

Plants with spines or prickles.

I. LACUSTRIA.

Plants without spines or prickles.

II. VIBURNIFOLIA.

Leaves evergreen, not palmately lobed.

Leaves deciduous, more or less palmately lobed.

Ovary with sessile glands; free portion of hypanthium saucer-shaped.

III. HUDSONIANA.

Ovary without glands or the glands stalked.

Free portion of hypanthium obsolete; the sepals slightly united at the base.

Ovary smooth.

IV. RUBRA.

Ovary with gland-tipped hairs or rarely only with glandless hairs.

V. PROSTRATA.

Free portion of hypanthium evident.

Anthers with a conspicuous cup-shaped gland at the apex.

VI. VISCOSISSIMA.

Anthers with at most a mere callus at the apex.

Leaves involute in veneration; hypanthium tube smooth, yellow.

VII. AUREA.

Leaves plicate in veneration; hypanthium tube usually hairy, not yellow.

VIII. SANGUINEA.

I. LACUSTRIA.

Leaves smooth or nearly so; racemes commonly 10-15-flowered; berry black.

1. *R. lacustre*.

Leaves pubescent and glandular on both surfaces; racemes commonly 3-7-flowered; berry red.

2. *R. montigenum*.

II. VIBURNIFOLIA.

Leaves firm-coriaceous, repand-dentate or entire.

3. *R. viburnifolium*.

III. HUDSONIANA.

Floral bracts large, broadest above the middle, those near the base of the raceme often foliaceous; sepals green; berry with a whitish bloom.

4. *R. bracteosum*.

Floral bracts small, narrowed from the base to a sharp apex; sepals white; berry black, without bloom.

5. *R. petiolare*.

IV. RUBRA.

Sepals and petals yellowish green; anther cells distinctly separated by a broad connective.

6. *R. sativum*.

Sepals usually mottled with purple; petals red; anther cells contiguous.

7. *R. triste*.

V. PROSTRATA.

Bracts nearly equaling or exceeding the pedicels.

Racemes erect or ascending; berries at maturity bright red and without bloom.

8. *R. erythrocarpum*.

Racemes reflexed, and the pedicels again recurved upward; berry blue-black, with a bloom.

9. *R. acerifolium*.

Bracts not over half the length of the pedicels.

10. *R. laxiflorum*.

VI. VISCOSISSIMA.

Hypanthium over twice as long as broad; berry bright red at maturity.

Styles usually pubescent above; bracts cuneate-obovate, the rounded or truncate apex cut into several deep teeth or lobes.

11. *R. cereum*.

Styles usually glabrous; bracts rhombic, often narrowly so, usually acute at the apex and entire or occasionally with one lateral lobe, the margin usually minutely glandular-denticulate.

12. *R. inebrians*.

Hypanthium less than twice as long as broad; berry black or blue at maturity.

13. *R. viscosissimum*.

VII. AUREA.

Hypanthium as long as or little exceeding the sepals.

14. *R. aureum*.

Hypanthium about twice as long as the sepals.

15. *R. gracillimum*.

VIII. SANGUINEA.

Styles glabrous.

Sepals erect, together with the short bowl-shaped hypanthium 4-6 mm. long.

16. *R. nevadense*.

Sepals spreading, together with the tubular hypanthium 8-12 mm. long.

Leaves whitish tomentose beneath; ovary with short curled hairs among the gland-tipped ones; flowers red, in erect or ascending racemes.

17. *R. sanguineum*.

Leaves usually without tomentum beneath; ovary with only gland-tipped hairs; flowers rose-pink, in drooping racemes.

18. *R. glutinosum*.

Styles pubescent, at least below; ovary densely clothed with gland-tipped hairs and straight divergent white hairs.

Hypanthium longer than broad.

Hypanthium pink, about twice as long as broad.

19. *R. malvaceum*.

Hypanthium greenish white, little longer than broad.

20. *R. indecorum*.

Hypanthium much broader than long.

21. *R. canthariforme*.

1. *Ribes lacustre* (Pers.) Poir. Swamp or Prickly Currant. Fig. 2311.

Ribes oxycanthoides var. *lacustre* Pers. Syn. Pl. 1: 252. 1805.

Ribes lacustre Poir. in Lam. Encycl. Suppl. 2: 56. 1812.

Ribes echinatum Dougl. Trans. Hort. Soc. Lond. 7: 517. 1830.

Ribes parvulum Rydb. Mem. N.Y. Bot. Gard. 2: 203. 1900.

Stems ascending or nearly prostrate, about 1 m. long, the spines at the nodes usually 3, the internodes usually bristly. Leaves with slender pubescent petioles, nearly orbicular in outline, 3–5 cm. wide, deeply 5–7-lobed, the lobes acutish, incised-dentate, thin, glabrous or nearly so; pedicels slender; flowers green or purplish; hypanthium saucer-shaped; sepals short and broad; stamens very short, not exceeding the petals; berry black-purple, covered with weak gland-tipped hairs.

Wet mountain meadows, Boreal Zones; Alaska, south through the Pacific States to Humboldt and Siskiyou Counties, California, east to Newfoundland, south to Utah, Colorado, Michigan, and Pennsylvania. Type locality: Lake Mistassini, Canada. June–July.

2. *Ribes montigenum* McClatchie. Alpine Prickly Currant. Fig. 2312.

Ribes lacustre var. *molle* A. Gray, Bot. Calif. 1: 206. 1876.

Ribes nubigenum McClatchie, Erythea 2: 80. 1894. Not Philippi, 1857.

Ribes lacustre var. *lentum* M. E. Jones, Proc. Calif. Acad. II. 5: 681. 1895.

Ribes montigenum McClatchie, Erythea 5: 38. 1897.

Ribes lentum Coville & Rose, Proc. Biol. Soc. Wash. 15: 28. 1902.

Low straggly shrub, 3–6 dm. high, the stems more or less bristly, the nodal spines short or sometimes exceeding the leaves, the whole plant densely short-pubescent and glandular. Leaves 15–25 mm. broad, deeply 5-lobed, the lobes incised-serrate; racemes short, few-flowered; pedicels 2–5 mm. long; hypanthium saucer-shaped, glandular-bristly; sepals 3–4 mm. long; berries red, glandular-bristly.

Dry rocky slopes, Boreal Zones; interior of British Columbia and eastern Washington to southern California, east to Montana and New Mexico. Type locality: Mount San Antonio, southern California. June–July.

3. *Ribes viburnifolium* A. Gray. Evergreen or Catalina Currant. Fig. 2313.

Ribes viburnifolium A. Gray, Proc. Amer. Acad. 17: 202. 1882.

Evergreen shrub, with straggling branches, the young twigs resinous-glandular. Leaves oval or somewhat obovate, 2–7 cm. long, obtuse or rounded at the apex, sparingly repand-dentate or entire, thick, dark green above, paler and resinous beneath, otherwise glabrous or somewhat pubescent when young; racemes as long as the leaves or shorter, few- to several-flowered; pedicels 5–10 mm. long, filiform; hypanthium turbinate; sepals oval, spreading, rose-colored; petals greenish, minute; berry glabrous, about 6 mm. in diameter.

Slopes of canyons, Sonoran Zones; Santa Catalina Island, southern California, and Lower California. Type locality: near All Saints Bay, Lower California. March–April.

4. *Ribes bracteosum* Dougl. Stink Currant. Fig. 2314.

Ribes bracteosum Dougl. ex Hook. Fl. Bor. Amer. 1: 233. 1832.

Ribes bracteosum var. *viridiflorum* Jancz. Mém. Soc. Genève 35: 339. 1907.

Stems erect or ascending, 1–4 m. high, the young branches, leaves, and inflorescence sparingly and loosely pubescent. Leaves 5–20 cm. broad, thin, deeply 5–7-lobed, the lobes ovate to ovate-lanceolate, acute, sharply and irregularly serrate; racemes erect, often 20 cm. long, loosely flowered; pedicels filiform, 1 cm. long or less; lower bracts often foliaceous and lobed; hypanthium saucer-shaped; sepals green, 3–4 mm. long, spreading; petals minute; stamens very short; berry black with a whitish bloom, resinous-dotted, 8–10 mm. in diameter.

Stream banks and bottom lands along the coast, mainly Canadian Zone; southern Alaska to Mendocino County, California. May–June.

5. *Ribes petiolare* Dougl. Western Black Currant. Fig. 2315.

Ribes petiolare Dougl. Trans. Hort. Soc. Lond. 7: 514. 1830.

Ribes hudsonianum var. *petiolare* Jancz. Mém. Soc. Genève 35: 346. 1907.

Branches erect or ascending. Leaves thin, resinous-dotted beneath, otherwise glabrous or slightly pubescent when young, mostly 5-lobed; petioles slender, longer than the blades; racemes erect, 5–12 cm. long, densely flowered, or the lower flowers distant; pedicels filiform, usually much longer than the pointed bracts; hypanthium bowl-shaped, resinous-dotted; sepals white, ovate, 7 mm. long; berry resinous-dotted, black, without bloom, about 10 mm. in diameter.

Arid Transition Zone; interior of British Columbia, south through eastern Washington to southeastern Oregon and northern Siskiyou and Modoc Counties, California, east to Montana, Wyoming, and Utah. Type locality: western base of the Rocky Mountains, lat. 48° to 52°. May–July.

6. *Ribes sativum* (Reichb.) Syme. Garden Currant. Fig. 2316.

Ribes rubrum var. *sativum* Reichb. Fl. Germ. Excurs. 562. 1830–32.

Ribes sativum Syme, Eng. Bot. 4: 42. 1865.

Ribes hortense Hedlund, Bot. Notiser 1901: 94. 1901.

Shrub, with erect stems, 10–15 dm. high, pubescent with simple and gland-tipped hairs on

the young twigs, petioles and lower surface of the leaves. Leaves nearly orbicular in outline, 7 cm. or less in width, 3-5-lobed, the lobes acutish, serrate-dentate, dark green and with scattered hairs above, paler beneath and pubescent especially on the veins; racemes few- to many-flowered, drooping; pedicels filiform, 3-5 mm. long; bracts ovate, much shorter than the pedicels; hypanthium saucer-shaped, green or slightly tinged with purple; sepals 2-3 mm. long, spreading; petals yellowish green; stamens very short; berry red, glabrous, 4-8 mm. in diameter.

Escaped from cultivation about the older settlements in western Oregon. Native of Europe. May-June.

7. *Ribes triste* Pall. Wild Red Currant. Fig. 2317.

Ribes triste Pall. Nova Acta Acad. Petrop. 10: 378. 1797.

Ribes albinervum Michx. Fl. Bor. Amer. 1: 110. 1803.

Ribes ciliosum Howell, Fl. N.W. Amer. 1: 208. 1898.

Ribes migratorium Suksdorf, Deutsch. Bot. Monatss. 18: 86. 1900.

Shrub, with creeping or ascending stems, 1 m. long or less, the young shoots sparingly pubescent and glandular. Leaves reniform-orbicular in outline, 6-10 mm. in diameter, 3-5-lobed, thin, dark green and usually glabrous above, pale beneath and glabrate or distinctly pubescent, the lobes acute, coarsely dentate-serrate, more or less cordate at base and usually conspicuously decurrent on the petiole; racemes generally shorter than the leaves, several-flowered, drooping; pedicels 3-8 mm. long, usually sparingly glandular-pubescent; flowers purple; hypanthium saucer-shaped, purple; petals red; berry red, 6-8 mm. in diameter, glabrous.

Wet meadows and swamps, mainly Canadian Zone; Alaska to Newfoundland, south to the Cascade Mountains, Oregon, South Dakota, Michigan, and New Jersey; also in northern Asia. Type locality: Siberia. May-July.

8. *Ribes erythrocarpum* Cov. & Leib. Crater Lake Currant. Fig. 2318.

Ribes erythrocarpum Cov. & Leib. Proc. Biol. Soc. Wash. 10: 132. 1896.

Shrub, with trailing and rooting branches, the upright shoots 1-2 dm. high, pubescent and glandular with short-stalked glands on the foliage and inflorescence. Leaves orbicular in outline, 5 cm. wide or less, deeply 3-5-lobed, the lobes obtuse, crenate and serrulate; racemes erect, few- to many-flowered; bracts equaling the pedicels; hypanthium short; sepals tinged with yellow or salmon, spreading, 3 mm. long; petals about half the length of the sepals and similarly colored; berry red, 8-10 mm. long, covered with short glandular hairs.

Mountain forests and glades, Canadian Zone; Cascade Mountains, southern Oregon, from Douglas County to Klamath and Jackson Counties. Type locality: Canyon of Pole Bridge Creek, south of Crater Lake, Cascade Mountains, Oregon. May-Aug.

9. *Ribes acerifolium* Howell. Maple-leaved Currant. Fig. 2319.

Ribes acerifolium Howell, Erythea 3: 34. 1895.

Ribes Howellii Greene, Erythea 4: 57. 1896.

Shrub, with erect stems about 1 m. high. Leaves a little broader than long, 4-8 cm. wide, 3-5-lobed, thin, glabrous above, puberulent beneath at least on the veins, and glandular resinous-dotted, the lobes ovate, acutish, irregularly serrate; petioles about as long as the blades, dilated and ciliate at the base; raceme reflexed with upturned pedicels; bracts lanceolate, equaling or exceeding the pedicels; hypanthium urn-shaped; sepals obovate, 3-4 mm. long; petals red, about 1 mm. long; berry blue-black, with a bloom, glandular-pubescent, 6-10 mm. in diameter.

Alpine ravines, Hudsonian Zone; Cascade Mountains from British Columbia to Mount Hood, Oregon, also in the Olympic Mountains, Washington. Type locality: Mount Hood, Oregon. June-Aug.

10. *Ribes laxiflorum* Pursh. Trailing Black Currant. Fig. 2320.

Ribes americanum Pall. Fl. Ross. 1: 34. 1788. Not Mill. 1768.

Ribes laxiflorum Pursh, Fl. Amer. Sept. 731. 1814.

Ribes affine Dougl. ex Bong. Mém. Acad. St. Pétersb. VI. 2: 138. 1832.

Shrub, with decumbent branches, the young twigs puberulent. Leaves orbicular in outline, 5-10 cm. in diameter, deeply 5-lobed, thin, glabrous above, somewhat pubescent beneath, sparingly ciliate on the margins, the lobes acute, usually sharply serrate; petioles slender, about as long as the blade, glandular-pubescent on the dilated base; racemes erect-spreading, 6-12-flowered, about as long as the leaves, puberulent and glandular; pedicels 6-12 mm. long; bracts lanceolate, much shorter than the pedicels; hypanthium very short; sepals 3-4 mm. long; berry black or purple, glandular-pubescent and glaucous.

Moist places, mainly Canadian Zone; in the Pacific States confined to the coastal region from northern California northward, but in British Columbia extending eastward to the Selkirk Mountains, also in Alaska and eastern Asia. Type locality: northwest coast of North America. March-June. Western Black Currant.

11. *Ribes cereum* Dougl. White Squaw Currant. Fig. 2321.

Ribes cereum Dougl. Trans. Hort. Soc. Lond. 7: 512. 1830.

Cerophyllum Douglasii Spach. Hist. Vég. 6: 153. 1838.

Ribes balsamiferum Kell. Proc. Calif. Acad. 2: 94. 1861.

A much branched shrub, 5-10 dm. high, the young branchlets finely pubescent. Leaves reniform-orbicular, 1-4 cm. wide, cordate to truncate at base, puberulent and more or less glandular or the upper surface glabrate, the lobes 3-5, obtuse, crenate or crenulate; petioles as long as the blades or shorter, puberulent; flowers few, crowded on the short, pendulous racemes; bracts

cuneate-obovate, obtuse or truncate, lobed or dentate, 4–7 mm. long, pubescent and glandular; pedicels much shorter than the bracts; hypanthium cylindrical, 6–8 mm. long, greenish to white or cream-colored; sepals 2 mm. long, ovate; anthers with a cup-shaped gland at apex; styles usually hairy below; berry bright red.

Dry gravelly or rocky ridges, mainly Canadian Zone; British Columbia to southern California, east to Montana, Utah, and northwestern Arizona. Type locality: on decayed granite or schist along the Columbia River from the Great Falls (The Dalles) to its source. June–July. Sheep Currant.

Ribes reniforme Nutt. Journ. Acad. Phila. 7: 25. 1834. (*Ribes cereum* var. *pedicellare* A. Gray, Bot. Calif. 1: 207. 1876.) Closely resembling the preceding species in general habit. Leaves with sessile glands on both surfaces, but otherwise glabrous; petioles and racemes glabrous; bracts entire or nearly so, glandular but not pubescent; hypanthium and ovary with a few short-stalked glands but no pubescence; styles usually glabrous; berry bright red, glandular or sometimes glabrous.

Dry mountain ridges, mainly Canadian Zone; Blue Mountains of Oregon and adjacent Washington to Montana. Type locality: sources of the Columbia. June–July.

12. *Ribes inebrians* Lindl. Pink Squaw Currant. Fig. 2322.

Ribes inebrians Lindl. Bot. Reg. 17: pl. 1471. 1832.

Cerophyllum spathianum Koehne, Gartenfl. 48: 338. 1899.

Ribes Churchii Nels. & Kenn. Proc. Biol. Soc. Wash. 19: 36. 1906.

Ribes pumilum Nutt. ex Rydb. Fl. Colo. 177. 1906.

Closely resembling *R. cereum* in general habit, and in pubescence of twigs and leaves. Rachis of the racemes puberulent and usually glandular; bracts entire or sometimes with a lateral lobe or tooth, usually glandular-ciliate; hypanthium usually pink or pinkish; ovary with stalked glands; styles usually glabrous; berry bright red, glandular or rarely smooth.

Dry mountain ridges, mainly Canadian Zone; eastern slopes of the Sierra Nevada, California, and northern Nevada. Type locality: described from cultivated plants, the source of which was not given. June–July.

13. *Ribes viscosissimum* Pursh. Sticky Currant. Fig. 2323.

Ribes viscosissimum Pursh, Fl. Amer. Sept. 163. 1814.

Coreosma viscosissima Spach, Ann. Sci. Nat. II. 4: 23. 1835.

Low branched shrub, 1 m. high or less, the young twigs glandular-pubescent. Leaves reniform-orbicular in outline, 5–8 cm. wide, pubescent and glandular-pubescent on both surfaces, the lobes usually 5, short, rounded, irregularly crenate-dentate; petioles shorter than the blades, much dilated at base, densely glandular-pubescent; racemes usually as long as the leaves or longer, the rachis glandular-pubescent; bracts herbaceous, about equaling the pedicels, entire or minutely erose; pedicels about 1 cm. long; hypanthium broadly cylindrical, 6–7 mm. long, greenish or pinkish; sepals about as long as the hypanthium, oblong, sparingly or not at all glandular; ovary glandular-pubescent; berry black, without bloom, more or less glandular-bristly.

Coniferous forests, mainly Canadian Zones; British Columbia to northern California, east to Montana and Colorado. Type locality: Rocky Mountains. June–July.

Ribes viscosissimum var. *Hállii* Jancz. Mém. Soc. Genève 35: 328. 1907. Resembling *R. viscosissimum* in general habit. Leaves rather firmer in texture and smaller, 2–5 cm. wide; racemes nodding, as long as the leaves or shorter; bracts mostly longer than the pedicels; ovary glabrous, rarely with a few glands; sepals shorter than the hypanthium; berry covered with a light bluish bloom.

Coniferous forests, mainly Canadian Zone; Siskiyou and Cascade Mountains, southern Oregon, to the northern Sierra Nevada, California, and western Nevada. Type locality: northern California.

14. *Ribes aureum* Pursh. Golden Currant. Fig. 2324.

Ribes aureum Pursh, Fl. Amer. Sept. 164. 1814.

Ribes tenuiflorum Lindl. Trans. Hort. Soc. Lond. 7: 242. 1828.

An erect shrub, 1–2 m. high, the branchlets glabrous. Leaves reniform-orbicular to obovate in outline, variously lobed or dentate, cuneate to subcordate at base, 5 cm. wide or less, glabrous or pubescent and ciliate when young; racemes 3–7 cm. long; hypanthium 6–10 mm. long, yellow; sepals 5–8 mm. long; petals oblong, 2 mm. long; berry glabrous, yellow, red, or black.

Along streams, Transition and Upper Sonoran Zones; eastern Washington to northeastern California, east to Assiniboia, Black Hills, South Dakota, New Mexico, and Arizona. Type locality: "On the banks of the rivers Missouri and Columbia." Collected by the Lewis and Clark Expedition. May.

15. *Ribes gracillimum* Cov. & Britt. Bugle Currant. Fig. 2325.

Ribes gracillimum Cov. & Britt. N. Amer. Fl. 22: 205. 1908.

Ribes aureum var. *gracillimum* Jepson, Man. Fl. Pl. Calif. 468. 1925.

Erect, usually much-branched shrub, 1–2 m. high, glabrous throughout, or the bases of the petioles with a few hairs. Leaves 2.5 cm. wide or less, rather thin in texture, ovate to rounded in outline, 3-lobed and dentate, cuneate at base; petioles very slender, often as long as the blades, frequently bearing small sessile glands; hypanthium 6–8 mm. long, yellow; sepals 3–4 mm. long; berry smooth.

Along streams, Upper Sonoran Zones; Coast Ranges, central California to southern California. Type locality: Los Trancos Creek, near Stanford University, California. April.

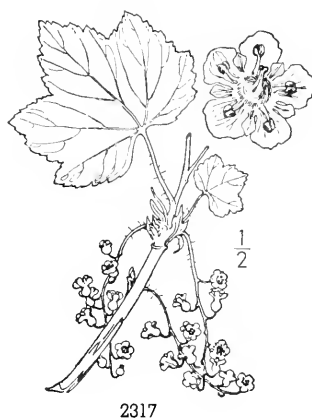
Ribes odoratum Wendl. f. in Bartl. & Wendl. f. Beitr. 2: 15. 1825. Erect shrub, 1–2 m. high, the young twigs pubescent. Leaves 2–5 cm. wide, firm in texture, glabrate on both surfaces, round-reniform in outline, cuneate to truncate at base, deeply 3–5-lobed, the lobes coarsely dentate or crenate-dentate; racemes mostly 4–8-flowered, the rachis pubescent; pedicels usually pubescent, shorter than the bracts; hypanthium yellow, 12–15 mm. long; sepals oblong, 5–6 mm. long; berry black. Native of the Great Plains region, and occasionally escaped from cultivation in the Pacific States.



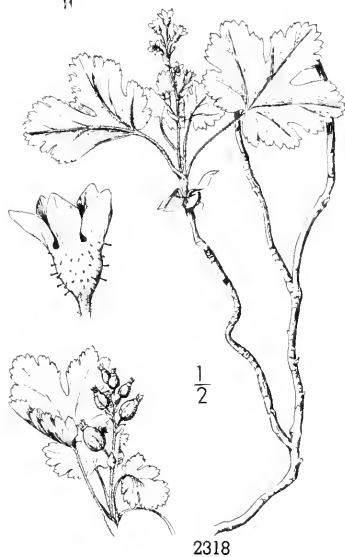
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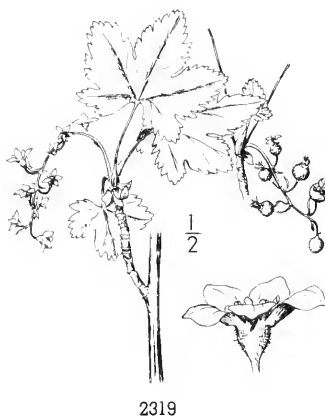
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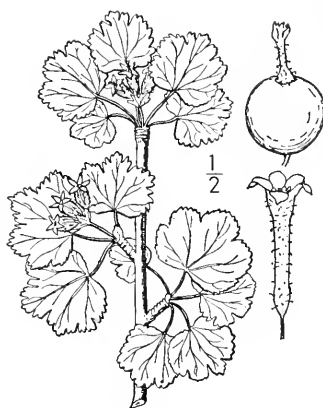
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2315. *Ribes petiolare*
 2316. *Ribes sativum*
 2317. *Ribes triste*

2318. *Ribes erythrocarpum*
 2319. *Ribes acerifolium*
 2320. *Ribes laxiflorum*

2321. *Ribes cereum*
 2322. *Ribes inebrians*
 2323. *Ribes viscosissimum*

16. *Ribes nevadense* Kell. Sierra Nevada Currant. Fig. 2326.

Ribes nevadense Kell. Proc. Calif. Acad. 1: 63. 1855.
Ribes ascendens Eastw. Proc. Calif. Acad. III. 2: 244. 1902.
Ribes Hittellianum Eastw. loc. cit.
Ribes glaucescens Eastw. Proc. Calif. Acad. III. 2: 245. 1902.
Ribes Grantii Heller, Muhlenbergia 4: 27. 1908.

Slender, loosely branching shrub, 1–2 m. high, young twigs puberulent or glabrous, older bark flaky, deciduous. Leaves orbicular in outline, 4–8 cm. broad, thin, not rugose, bright green and glabrous above, paler beneath and slightly pubescent; racemes rather short and dense, on long slender usually drooping peduncles; pedicels 3–5 mm. long, shorter than the pink or greenish bracts; hypanthium rose-colored, 2 mm. long or less; sepals erect, a little longer than the hypanthium; ovary beset with short-stalked or barely sessile glands; style glabrous; berry blue-black, glaucous, sparingly glandular.

Mountain streams and meadows, Transition and Canadian Zones; southern Oregon to southern California, east to western Nevada. Type locality: not given, but probably near Placerville, California. May–June.

17. *Ribes sanguineum* Pursh. Red Flowering Currant. Fig. 2327.

Ribes sanguineum Pursh, Fl. Amer. Sept. 164. 1814.
Calobotrya sanguinea Spach, Ann. Sci. Nat. II. 4: 21. 1835.
Coreosma sanguinea Spach, Hist. Vég. 6: 155. 1838.
Ribes Scuphamii Eastw. Proc. Calif. Acad. III. 2: 242. 1902.

Erect shrub, 1–4 m. high, the young twigs puberulent and often with stalked glands. Leaves round-reniform in outline, 3–5-lobed, dark green and puberulent above, white-tomentose beneath; racemes erect or ascending, usually longer than the leaves, pubescent and glandular; pedicels 5–10 mm. long; bracts exceeding the pedicels; hypanthium cylindrical-campanulate, 3–5 mm. long, red, pubescent; sepals oblong, slightly longer than the hypanthium; petals spatulate, about half as long as the sepals; style glabrous; berry blue-black, with a bloom, slightly glandular.

Along streams and ravines, mainly Humid Transition Zone; western British Columbia to northwestern California. Type locality: on the Columbia River. April–May. Blood Currant.

18. *Ribes glutinosum* Benth. Winter Currant. Fig. 2328.

Ribes glutinosum Benth. Trans. Hort. Soc. Lond. II. 1: 476. 1835.
Ribes sanguineum var. *glutinosum* Loud. Arb. 988. 1836.
Ribes albidum Paxton, Paxton's Mag. Bot. 10: pl. 55. 1843.
Ribes glutinosum var. *melanocarpum* Greene, Man. Bay Reg. 124. 1894.
Ribes Santae-Luciae Jancz. Bull. Acad. Cracovie 1906: 9. 1906.
Ribes deductum Greene ex Jancz. Mém. Soc. Genève 35: 320. 1907.

Resembling *R. sanguineum* in general habit, but the young twigs, petioles and racemes more or less pubescent and glandular. Leaves slightly or not at all tomentose beneath, more or less puberulent and glandular on both surfaces, the upper surface often glabrate in age; racemes spreading or drooping; pedicels 5–10 mm. long, usually longer than the bracts; hypanthium nearly cylindrical, 3–5 mm. long, rose-colored or rarely white, pubescent and slightly glandular; sepals rose-colored, a little longer than the hypanthium; ovary with stalked glands; style glabrous; berry bluish with a bloom, or sometimes black.

Mountain streams, Humid Transition Zone; Coast Ranges, from Humboldt County to San Luis Obispo County, California. Type locality: California. March–April.

2324. *Ribes aureum*2325. *Ribes gracillimum*2326. *Ribes nevadense*

19. *Ribes malvaceum* Smith. Chaparral Currant. Fig. 2329.

Ribes malvaceum Smith in Rees, Cycl. 30: No. 13. 1815.

Ribes tubulosum Eschsch. Mém. Acad. St. Pétersb. 10: 283. 1826.

Ribes tubiflorum C. A. Meyer, Mém. Acad. Mosc. 7: 140. 1829.

Ribes sanguineum var. *malvaceum* Loud. Arb. 988. 1836.

Shrub with mostly strictly erect branches, 1–2 m. high, the young twigs tomentose and glandular as are also the petioles, under surface of the leaves and the inflorescence. Leaves mostly rounded in outline, 2–5 cm. wide, rather thick, the upper surface markedly rugulose, dull green, sparingly pubescent and glandular with short-stalked glands, the under surface canescent with a dense tomentum, the 3–5 lobes crenulate; racemes drooping, longer than the leaves; pedicels 2–5 mm. long, recurved in fruit; bracts longer than the pedicels; ovary densely tomentose with intermingling glandular hairs; hypanthium rose-colored, 5–7 mm. long; sepals shorter than the hypanthium; petals rounded and short-clawed; styles pubescent below; berry viscid-pubescent, glaucous.

On wooded or chaparral-covered slopes, Upper Sonoran Zone; Coast Ranges from Tehama County to Santa Barbara County, California. Type locality: California. Oct.–March. California Black Currant.

Ribes malvaceum var. *viridiflorum* Abrams, Bull. S. Calif. Acad. 1: 67. 1902. (*Ribes purpurascens* Heller, Muhlenbergia 4: 29. 1908.) The twigs and leaves less tomentose and more glandular. Leaves brighter green, less rugulose on the upper surface; hypanthium 8–12 mm. long. Wooded north slopes, Upper Sonoran Zone; mountains of southern California.

20. *Ribes indecòrum* Eastw. White-flowered Currant. Fig. 2330.

Ribes indecorum Eastw. Proc. Calif. Acad. III, 2: 243. 1902.

Ribes malvaceum var. *indecòrum* Jancz. Mém. Soc. Genève 35: 325. 1907.

An erect shrub, 1–2 m. high, the twigs tomentose and glandular. Leaves 2–4 cm. broad, finely rugose on the upper surface, glandular-pubescent and sparsely strigose, the lower surface densely white-tomentose; racemes 2–3 cm. long, pedicels 1–2 mm. long; bracts much longer than the pedicels; hypanthium campanulate, 3–4 mm. long, pale rose or white; sepals shorter than the hypanthium, oval; style pubescent at base, ovary densely tomentose; berry viscid.

Dry washes and chaparral-covered hills, Upper Sonoran Zone; Ventura County, California, to northern Lower California. Type locality: Cajon Heights, near San Diego, California. Oct.–March.

21. *Ribes canthariforme* Wiggins. Moreno Currant. Fig. 2331.

Ribes canthariforme Wiggins, Contr. Dudley Herb. 1: 101. pl. 9. 1929.

A much branched erect shrub, 1–2 m. high, the young twigs cinnamon-brown, pubescent with simple white hairs and capitate glandular ones. Leaves suborbicular in outline, 4–6 cm. broad, bright green, moderately villous and slightly rugulose above, gray-green and densely pubescent beneath; racemes 2–4 cm. long, drooping, many-flowered; pedicels scarcely 1 mm. long; hypanthium broadly urceolate, 4 mm. broad, about 1 mm. high; sepals broadly spatulate, 1.5 mm. long, rotate-spreading, purple with dark purple veins; petals broadly obcuneate, truncate, less than 1 mm. long; berry purple to black, glandular-villous, becoming smooth in age.

Chaparral slopes, Upper Sonoran Zone; mountains of San Diego County, California. Type locality: near Moreno Dam, San Diego County, California. March–April.

2. GROSSULÀRIA [Tourn.] Mill. Gard. Dict. ed. 7. 1759.

Erect or spreading shrubs, armed at the nodes with simple or 3-forked spines, or rarely spineless. Racemes one- to few-flowered; bracts present; bractlets absent or if present situated on the base of the pedicel. Ovary often spiny. Fruit not disarticulating from the pedicel. [Name from Middle Low German, *grossel-beere*, meaning gooseberry.]

A genus of about 65 species, natives of the north temperate zone. Type species, *Ribes Grossularia* L.

Flowers 5-merous; petals much shorter than the sepals.

Anthers not broader at base than at apex, usually less than 2 mm. long.

Styles hairy toward the base; ovary not bristly, either smooth, pubescent, or beset with stalked glands.

Stamens about twice the length of the petals or longer.

I. DIVARICATAE.

Stamens equaling the petals.

II. SETOSAE.

Styles glabrous throughout.

Flowers usually of some other color than deep red or purple; filaments (except in *G. binominata*) equaling or shorter than the petals.

Ovary not bristly, either glabrous or pubescent with weak glandless or gland-tipped hairs.

III. MICROPHYLLAE.

Ovary densely bristly, the bristles developing into sharp spines in fruit.

IV. WATSONIANAE.

Flowers deep red or purple; filaments twice the length of the petals or more.

V. LOBBII.

Anthers lanceolate to lanceolate-ovate, 2 mm. long or more.

VI. MENZIESII.

Flowers 4-merous, bright red; petals equaling the sepals.

VII. SPECIOSAE.

I. DIVARICATAE.

Stamens well exceeding the extended sepals; sepals 2–4 times the length of the hypanthium.

1. *G. divaricata*.

Stamens equaling or shorter than the extended sepals; sepals 1–2 times the length of the hypanthium.

Hypanthium and sepals green, together 5–7 mm. long; petals white.

Leaves glabrous on both surfaces; hypanthium and sepals glabrous.

2. *G. inermis*.

Leaves villous on both surfaces; hypanthium and sepals usually hirsute.

3. *G. klamathensis*.

Hypanthium and sepals purple, together 8–10 mm. long; petals red.

4. *G. Parishii*.

II. SETOSAE.

Hypanthium narrowly tubular, 2-4 times as long as broad; longer than the white or pinkish sepals.

5. *G. cognata*.

Hypanthium campanulate, scarcely longer than broad, shorter than the green or greenish white sepals.

6. *G. irrigua*.

III. MICROPHYLLAE.

Ovary glabrous or with a few hairs.

Hypanthium about 4 mm. long, longer than the sepals.

7. *G. lasiantha*.

Hypanthium about 2.5 mm. long, equaling or shorter than the sepals.

8. *G. quercetorum*.

Ovary densely pubescent and often glandular-hairy.

9. *G. velutina*.

IV. WATSONIANAE.

Leaves without gland-tipped hairs; stamens exceeding the petals by the length of the anthers.

10. *G. binominata*.

Leaves with gland-tipped hairs; stamens about equaling the petals.

Plants erect; young twigs merely puberulent.

11. *G. Watsoniana*.

Plants trailing; young twigs with gland-tipped bristles.

12. *G. tularensis*.

V. LOEBII.

Young shoots densely beset with coarse bristly hairs in addition to the nodal spines.

13. *G. sericea*.

Young shoots very rarely with a few bristles in addition to the nodal spines.

Leaves densely glandular and viscid beneath.

14. *G. Lobbii*.

Leaves glabrous or nearly so beneath.

15. *G. Marshallii*.

VI. MENZIESII.

Hypanthium about as long as broad and about a third or fourth as long as the sepals; young branches usually with bristles in addition to the nodal spines.

Sepals greenish white; ovary with gland-tipped hairs but without intermingling glandless bristles.

16. *G. Victoris*.

Sepals purple to green; ovary, at least when the sepals are green, with glandless bristles intermingling with the gland-tipped hairs.

Ovary densely clothed with long straight white glandless hairs, with a few gland-tipped ones intermingling.

17. *G. scnilis*.

Ovary with or without sparse inconspicuous curled hairs interspersed among the gland-tipped ones.

Leaves conspicuously glandular-pubescent; bristles of the ovary chiefly gland-tipped; young shoots densely bristly.

Leaves thick, usually rugose, densely velvety pubescent beneath with gland-tipped hairs interspersed.

18. *G. Menziesii*.

Leaves thin, not rugose, sparingly or not at all pubescent beneath when mature, the glands except those on the veins sessile or nearly so.

Young shoots densely bristly; petals 4-5 mm. long, barely or not at all exceeded by the filaments.

19. *G. Hystrix*.

Young shoots usually only sparingly bristly; petals 2.5-4 mm. long, the filaments nearly twice as long.

20. *G. leptosma*.

Leaves almost or quite devoid of glands beneath; ovary with chiefly or wholly glandless bristles; young shoots without bristles.

Leaves glabrous or nearly so on both surfaces; sepals usually with a tuft of hairs at the apex, otherwise glabrous.

21. *G. californica*.

Leaves sparingly puberulent on both surfaces; sepals sparingly villous over the outer surface.

22. *G. hesperia*.

Hypanthium much longer than broad; stems with nodal spines, but without bristles.

Fruit with strong eglandular spines; leaves very rarely with a few glands.

Sepals, hypanthium, and leaves glabrous.

23. *G. cruenta*.

Sepals and hypanthium pubescent, the leaves usually so.

24. *G. Roezlii*.

Fruit with short gland-tipped bristles; leaves glandular.

25. *G. amara*.

VII. SPECIOSAE.

Represented by only one species.

26. *G. speciosa*.

1. *Grossularia divaricata* (Dougl.) Cov. & Britt. Straggly Gooseberry. Fig. 2332.

Ribes divaricatum Dougl. Trans. Hort. Soc. Lond. 7: 515. 1830.

Ribes villosum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 547. 1840.

Ribes tomentosum K. Koch, Wochenschr. Gärt. & Pfl. 2: 138. 1859.

Ribes Suksdorfii Heller, Muhlenbergia 3: 11. 1907.

Grossularia divaricata Cov. & Britt. N. Amer. Fl. 22: 224. 1908.

Shrub, 2-3.5 m. high, widely branching, the branches commonly without bristles, nodal spines stout, often deflexed, sometimes wanting. Leaves thin, 2-6 cm. wide, usually 5-lobed, coarsely crenate-dentate, usually sparsely villous on the upper surface, pubescent on the veins beneath or glabrous; peduncles about as long as the petioles, drooping, 2-4-flowered; pedicels filiform, exceeding the bracts; ovary glabrous; hypanthium 2-3 mm. long, greenish purple, glabrous or sparingly villous; sepals green or tinged with purple, oblong, 2-3 times as long as the hypanthium; stamens longer than the sepals; style villous; berry smooth, black or dark purple.

Shaded stream banks and bottom land, Humid Transition Zone; western British Columbia to central California. Type locality: northwest coast of America. March-May.

2. *Grossularia inermis* (Rydb.) Cov. & Britt. White-stemmed Gooseberry. Fig. 2333.

Ribes inermis Rydb. Mem. N.Y. Bot. Gard. 1: 202. 1900.

Ribes Purpusii Koehne ex Blankinship, Mont. Agr. Coll. Sci. Stud. 1: 64. 1905.

Ribes vallicola Greene ex Rydb. Fl. Colo. 176, 177. 1906.

Ribes oxycanthoides var. *Purpusii* Jancz. Mém. Soc. Genève 35: 388. 1907.

Grossularia inermis Cov. & Britt. N. Amer. Fl. 22: 224. 1908.

Shrub, 1–2 m. high, the branches glabrous, bristles few or none, nodal spines few, 1 cm. long or less, rarely wanting. Leaves thin, 1–6 cm. wide, 3–5-lobed, crenate-dentate, glabrous; peduncles usually shorter than the petioles, 1–4-flowered; pedicels well exceeding the short bracts; ovary glabrous; hypanthium 2.5–3.5 mm. long, green, glabrous; sepals shorter than the hypanthium, green or tinged with purple; stamens shorter than the sepals; berry wine-colored, smooth.

Shaded stream banks and flats, Arid Transition Zone; interior of British Columbia, south through eastern Washington and Oregon to the southern Sierra Nevada, California, east to Montana, Colorado, and New Mexico. Type locality: Slough Creek, Yellowstone Park. May–June.

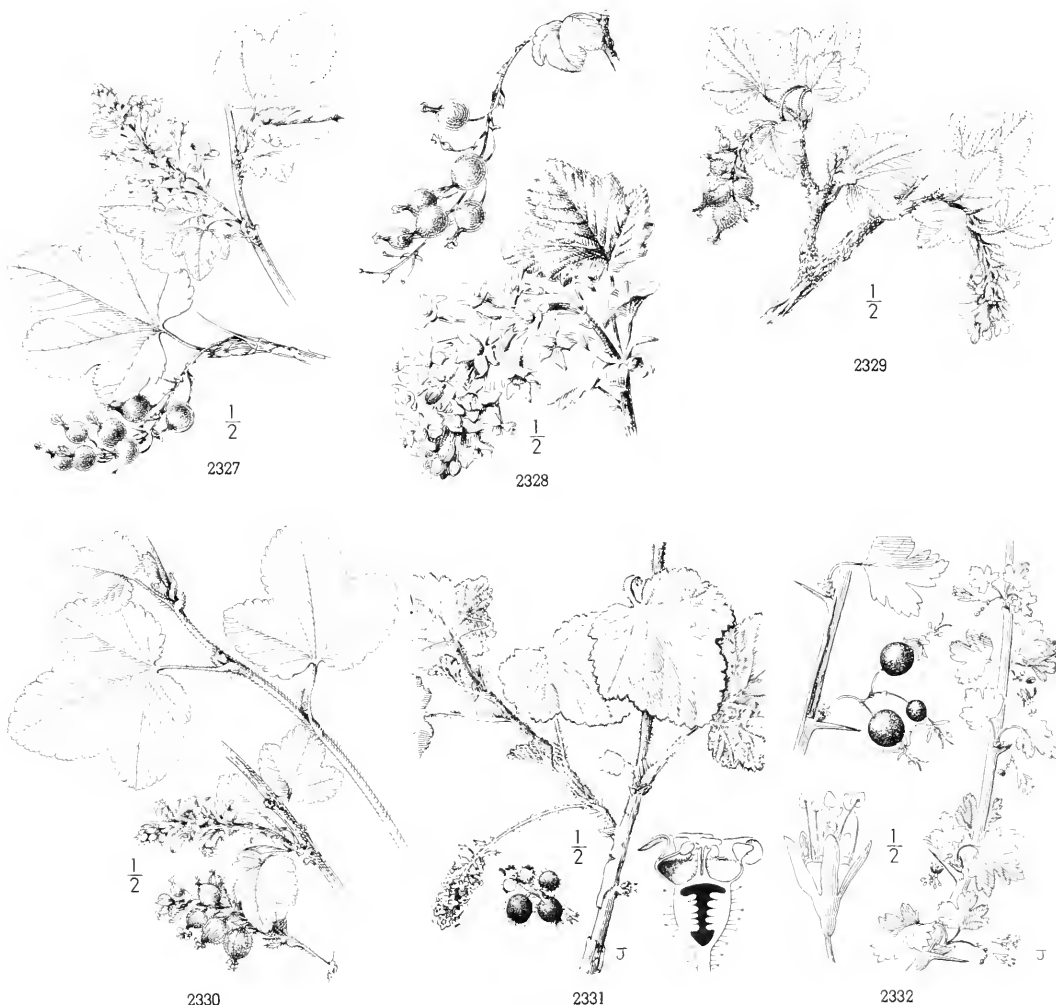
3. *Grossularia klamathensis* Coville. Klamath Gooseberry. Fig. 2334.

Grossularia klamathensis Coville, N. Amer. Fl. 22: 225. 1908.

Ribes inermis var. *klamathense* Jepson, Man. Fl. Pl. Calif. 472. 1925.

Shrub, 1–2 m. high, bristles usually none, nodal spines commonly single, 1 cm. long or less, often absent, young twigs glabrous, white. Leaves 2–5 cm. wide, 3–5-lobed, crenate, villous on both surfaces; peduncles 1–2 cm. long, glabrous, 2–5-flowered; bracts 2 mm. long; pedicels 8 mm. long, glabrous; ovary glabrous; hypanthium about 2 mm. long, green, sparingly villous or glabrous; sepals 4 mm. long, green with purple margins, sparingly villous or glabrous; stamens about equaling the sepals; styles villous; berry black, with bloom.

Wooded ravines and flats, Arid Transition Zone; Klamath Basin of southern Oregon and northeastern California. Type locality: Keno, Klamath County, Oregon. April–May.



2327. *Ribes sanguineum*
2328. *Ribes glutinosum*

2329. *Ribes malvaceum*
2330. *Ribes indecorum*

2331. *Ribes canthariforme*
2332. *Grossularia divaricata*

4. *Grossularia Parishii* (Heller) Cov. & Britt. Parish's Gooseberry. Fig. 2335.*Ribes Parishii* Heller, Muhlenbergia 1: 134. 1906.*Grossularia Parishii* Cov. & Britt. N. Amer. Fl. 22: 224. 1908.*Ribes divaricatum* var. *Parishii* Jepson, Fl. Calif. 2: 151. 1936.

Shrub with erect or straggly branches, bristles none or rarely few, nodal spines solitary, deflexed or spreading, young shoots pubescent. Leaves 2–5 cm. broad, 3–5-lobed, crenate-dentate, glabrous or nearly so on the upper surface, densely pubescent beneath, not at all glandular; petioles and peduncles pubescent, the latter nodding, 2–5-flowered; bracts 1–2 mm. long; pedicels well exceeding the villous bracts; ovary glabrous; hypanthium campanulate, 4 mm. long, purple-red, pubescent; sepals purplish, more or less pubescent, 6–8 mm. long; stamens nearly as long as the sepals; styles villous.

Shaded ravines and washes, Upper Sonoran Zone; southern California. Type locality: San Bernardino Valley, California. March–May.

5. *Grossularia cognata* (Greene) Cov. & Britt. Umatilla Gooseberry. Fig. 2336.*Ribes cognatum* Greene, Pittonia 3: 115. 1907.*Grossularia cognata* Cov. & Britt. N. Amer. Fl. 22: 222. 1908.

Shrub, 2–3.5 m. high, much branched, nodal spines subulate, 10–15 mm. long, young shoots white or gray, bristly or sometimes smooth. Leaves 1.5–4 cm. broad, 3–5-lobed, crenate-dentate, more or less pubescent on both surfaces and minutely glandular; petioles villous and glandular-pubescent; peduncles nodding, 2–5-flowered; bracts about as long as the pedicels, glandular-pubescent; ovary glabrous; hypanthium greenish white, sparingly hirsute, 3–6 mm. long, nearly tubular; sepals half to two-thirds as long as the hypanthium, white or pink; stamens shorter than the sepals; styles pubescent below; berry smooth.

Stream banks, Arid Transition Zone; Columbia Basin of eastern Washington and Oregon. Type locality: river banks at Pendleton, Oregon. May–June.

6. *Grossularia irrigua* (Dougl.) Cov. & Britt. Inland Black Gooseberry. Fig. 2337.*Ribes irriguum* Dougl. Trans. Hort. Soc. Lond. 7: 516. 1830.*Ribes divaricatum* var. *irriguum* A. Gray, Amer. Nat. 10: 273. 1876.*Ribes leucoderme* Heller, Bull. Torrey Club 24: 93. 1897.*Grossularia irrigua* Spach ex S. Wats. Bibl. Index 333, as a synonym. 1878.*Grossularia irrigua* Cov. & Britt. N. Amer. Fl. 22: 222. 1908.

Shrub, 1–3 m. high, usually bristly, nodal spines subulate, about 1 cm. long; young shoots pale gray, pubescent or glabrous, often without bristles. Leaves 3–7 cm. wide, 3–5-lobed, coarsely incised-dentate, thin, glabrous or nearly so on the upper surface, pubescent beneath; petioles villous and glandular-pubescent; peduncles nodding, 1–3-flowered; bracts glandular and ciliate, about equaling the short pedicels; ovary glabrous; hypanthium greenish, glabrous, broadly tubular, 3–4 mm. long; sepals greenish white, 6–8 mm. long; stamens about half as long as the sepals; style pubescent below; berry smooth.

Stream banks and bottom land, Arid Transition Zone; interior of British Columbia to the Blue Mountains, Oregon, northern Idaho, and western Montana. Type locality: Blue Mountains. April–June.

7. *Grossularia lasiantha* (Greene) Cov. & Britt. Alpine Gooseberry. Fig. 2338.*Ribes lasianthum* Greene, Pittonia 3: 22. 1896.*Grossularia lasiantha* Cov. & Britt. N. Amer. Fl. 22: 219. 1908.*Ribes leptanthum* var. *lasianthum* Jepson, Fl. Calif. 2: 152. 1936.

Low shrub, mostly 4–6 dm. high, with stout spreading branches, bristles none, nodal spines usually 3, yellowish, young shoots puberulent. Leaves 1–2 cm. wide, glandular and sparingly pubescent on both surfaces; petioles densely pubescent; peduncles about as long as the petioles, pubescent, 2–4-flowered; bracts broad, pubescent, longer than the short pedicels; ovary glabrous or sparsely pubescent; hypanthium 4–5 mm. long, cylindrical, pubescent, yellow; sepals shorter than the hypanthium, yellow; stamens slightly exceeding the spatulate petals.

Dry rocky ridges, Canadian Zone; central Sierra Nevada, California. Type locality: above Donner Lake, toward Castle Peak, California. June–July.

8. *Grossularia quercetorum* (Greene) Cov. & Britt. Oak Gooseberry. Fig. 2339.*Ribes quercetorum* Greene, Bull. Calif. Acad. 1: 83. 1885.*Ribes Congdonii* Heller, Muhlenbergia 1: 101. 1904.*Ribes leptanthum* var. *quercetorum* Jancz. Mém. Soc. Genève 35: 381. 1907.*Grossularia quercetorum* Cov. & Britt. N. Amer. Fl. 22: 220. 1908.

Shrub, 1–1.5 m. high, the branches arcuate-spreading, sparingly bristly or without bristles; nodal spines usually solitary, straight or slightly curved, 0.5–1 cm. long; young twigs pubescent. Leaves 1–2 cm. wide, suborbicular, 3–5-cleft, the lobes dentate, puberulent on both surfaces, sometimes also with a few scattered glands; peduncles 2–3-flowered; hypanthium 2.5–3 mm. long, greenish yellow, pubescent, cylindric; sepals yellow, equaling the hypanthium; petals cream-yellow, slightly longer than the stamens; ovary and style glabrous; berry glabrous, about 8 mm. in diameter.

Dry hillsides and mountain slopes, Upper Sonoran Zone; interior Coast Ranges (Monterey County) and southern Sierra Nevada (Kern County), California, to northern Lower California. Type locality: Paso Robles, California. March–May.

9. *Grossularia velutina* (Greene) Cov. & Britt. Plateau Gooseberry. Fig. 2340.*Ribes leptanthum* var. *brachyanthum* A. Gray, Bot. Calif. 1: 83. 1876.*Ribes velutinum* Greene, Bull. Calif. Acad. 1: 83. 1885.*Ribes glanduliferum* Heller, Muhlenbergia 2: 56. 1905.*Ribes Stanfordii* Elmer, Bot. Gaz. 41: 315. 1906.*Grossularia velutina* Cov. & Britt. N. Amer. Fl. 22: 220. 1908.

Shrub, 1–2 m. high, the branches recurved, without bristles; nodal spines acicular, 5–20 mm. long, straight or nearly so; young twigs puberulent. Leaves suborbicular, 1–1.5 cm. broad, 3–5-cleft, crenate, cordate to truncate at base, puberulent on both surfaces or glabrate; petioles pubescent, often with interspersed gland-tipped hairs; peduncles 1–3-flowered; hypanthium broadly cylindric, about 2 mm. long, 3 mm. wide, pubescent; ovary usually densely pubescent or glandular-hairy; sepals about 3 mm. long, white or pale yellow; petals 2–2.5 mm. long, white or yellowish; style glabrous; berry yellowish becoming nearly black.

Dry mountain ridges, Arid Transition and Canadian Zones; Deschutes and Jackson Counties, Oregon, to southern California, Nevada, Utah, and northern Arizona. Type locality: "northern California and regions adjacent." May–July.

10. *Grossularia binominata* (Heller) Cov. & Britt. Trailing Gooseberry. Fig. 2341.*Ribes ambiguum* S. Wats. Proc. Amer. Acad. 18: 193. 1883. Not Maxim. 1874.*Ribes montanum* Howell, Fl. N.W. Amer. 1: 210. 1898. Not Philippi, 1859–60.*Ribes binominatum* Heller, Cat. N. Amer. Fl. ed. 2. 5. 1900.*Grossularia binominata* Cov. & Britt. N. Amer. Fl. 22: 218. 1908.

Shrub with trailing branches about 1 m. long or less, bristles none; nodal spines usually 3, less than 1 cm. long; young twigs pubescent. Leaves 2–6 cm. wide, thin, incisely dentate-crenate, finely pubescent on the upper surface, densely pubescent beneath, not glandular; petioles hairy and villous; ovary bristly; hypanthium about 2 mm. long, short-cylindrical, green, villous; sepals 4–6 mm. long, greenish white, villous; style glabrous; berry densely covered with yellowish spines.

Coniferous forests, Canadian Zone; summits of the Siskiyou Mountains, southern Oregon and northern California. Type locality: forests of the Siskiyou Mountains near the summit. April–July.

11. *Grossularia Watsoniana* (Koehne) Cov. & Britt. Mount Adams Gooseberry. Fig. 2342.*Ribes Watsonianum* Koehne, Deuts. Dendr. 197. 1893.*Grossularia Watsoniana* Cov. & Britt. N. Amer. Fl. 22: 218. 1908.

Shrub with erect or ascending branches, 1–2 m. high, bristles none; nodal spines usually 3, stout; young twigs merely puberulent. Leaves 3–5 cm. wide, thin, sparingly pubescent on the veins and with a few stalked glands; petioles villous and glandular-pubescent; peduncles villous and glandular-pubescent, slender, 1–3-flowered; ovary densely covered with weak mostly gland-tipped bristles; hypanthium 2–3 mm. long, campanulate, green, sparingly pubescent; sepals 6–8 mm. long, green, pubescent or glabrate toward the base; style glabrous; berry densely covered with acicular bristles.

Coniferous forests, Canadian Zone; Cascade Mountains, southern Washington. Type locality: Washington. May–July.

12. *Grossularia tularensis* Coville. Sequoia Gooseberry. Fig. 2343.*Grossularia tularensis* Coville, N. Amer. Fl. 22: 218. 1908.*Ribes tularensis* Fedde, Bot. Jaresb. 36²: 519. 1910.

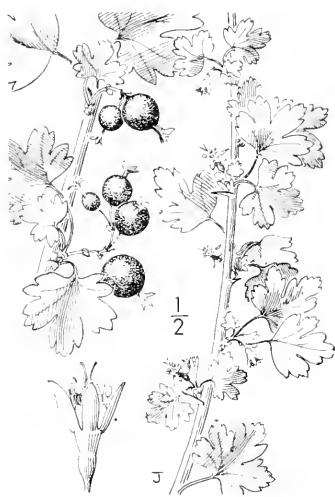
Prostrate shrub, the young twigs villous-pubescent and beset with weak gland-tipped bristles; nodal spines in threes, light brown or straw-colored. Leaves 2–5 cm. wide, villous-pubescent and glandular-hairy on both surfaces of the blade and petiole; peduncles slender, 1–3-flowered, pubescent like the leaves; ovary densely covered with weak mostly gland-tipped bristles; hypanthium 2–3 mm. long, campanulate, green, sparsely pubescent; sepals 6 mm. long, green, villous; styles smooth, about as long as the sepals; berry covered with straw-colored spines.

Coniferous forests, Arid Transition Zone; southern Sierra Nevada. Type locality: Giant Forest, Tulare County, California. June–July.

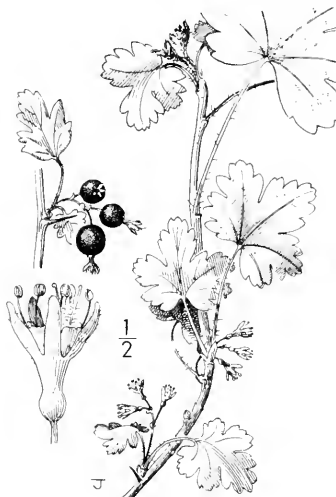
13. *Grossularia sericea* (Eastw.) Cov. & Britt. Santa Lucia Gooseberry. Fig. 2344.*Ribes sericeum* Eastw. Proc. Calif. Acad. III. 2: 246. 1902.*Ribes sericeum* var. *viridescens* Eastw. Proc. Calif. Acad. III. 2: 247. 1902.*Grossularia sericea* Coville, N. Amer. Fl. 22: 216. 1908.

Shrub 2 m. high or less, the branches densely covered with short weak gland-tipped bristles; nodal spines 3, stout. Leaves thin, 2–4 cm. wide, villous and glandular; petioles slender, glandular-pubescent; peduncles glandular-pubescent, 1–3-flowered; pedicels about 1 cm. long, glandular-pubescent; ovary densely glandular-bristly and somewhat villous; hypanthium 3–4 mm. long, campanulate, greenish red, pubescent; sepals 6–8 mm. long, red or greenish, villous-pubescent; stamens about three times as long as the petals; berry purple, densely bristly.

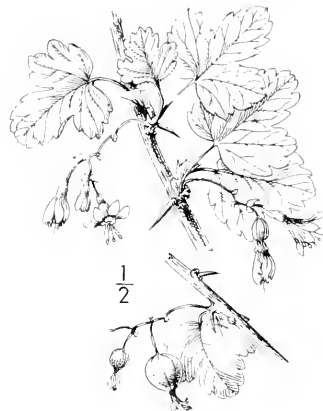
Along streams, Upper Sonoran Zone; Santa Lucia Mountains, California. Type locality: Spruce Creek, Monterey County, California. April–May.



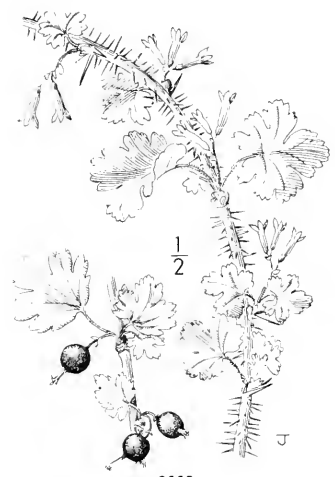
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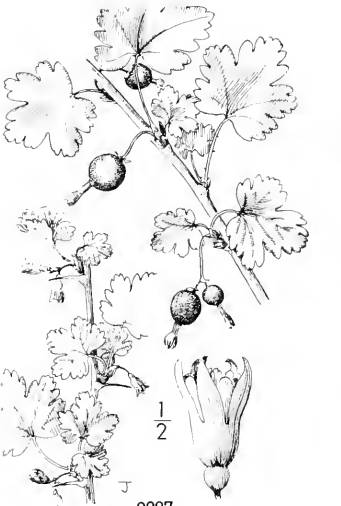
2334



2335



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2339



2340



2341

2333. *Grossularia inermis*
2334. *Grossularia klamathensis*
2335. *Grossularia Parishii*

2336. *Grossularia cognata*
2337. *Grossularia irrigua*
2338. *Grossularia lasiantha*

2339. *Grossularia quercetorum*
2340. *Grossularia velutina*
2341. *Grossularia binominata*

14. *Grossularia Lobbii* (A. Gray) Cov. & Britt. Gummy Gooseberry. Fig. 2345.*Ribes Lobbii* A. Gray, Proc. Amer. Acad. 10: 274. 1876.*Grossularia Lobbii* Cov. & Britt. N. Amer. Fl. 22: 217. 1908.

Shrub, 2 m. high or less without bristles; nodal spines 3, stout, the branches otherwise unarmed or with a few short scattered prickles; young twigs pubescent. Leaves thin, 2–3.5 cm. wide, sparsely pubescent when young and glandular-hairy, or glabrate above; petioles slender, glandular-pubescent; peduncles glandular-pubescent, 1–2-flowered; ovary densely covered with short-stalked glands; hypanthium 3–5 mm. long, narrowly campanulate, purple-red, finely pubescent; sepals 10–12 mm. long, reflexed, purple-red; stamens about equaling the sepals; berry oblong, densely glandular.

Moist coniferous woods, Humid Transition Zone; southwestern British Columbia to northwestern California. Type locality: Vancouver Island. April–June. Pioneer Gooseberry.

15. *Grossularia Marshallii* (Greene) Cov. & Britt. Hupa or Marshall's Gooseberry. Fig. 2346.*Ribes Marshallii* Greene, Pittonia 1: 31. 1887.*Grossularia Marshallii* Cov. & Britt. N. Amer. Fl. 22: 217. 1908.

Low spreading shrub; nodal spines 3, 1 cm. long or less; young twigs puberulent. Leaves very thin, 2.5–3.5 cm. wide, sparsely pubescent with simple and glandular hairs on the veins beneath; petioles with similar pubescence; peduncles 1-flowered, sparsely glandular-pubescent; ovary villous with weak glandless bristles interspersed; hypanthium 2–3.5 mm. long, green or tinged with purple, sparsely pubescent; sepals 12–15 mm. long; berry subglobose, covered with glandless spines.

Coniferous forests, Canadian Zone; Siskiyou and northern Humboldt Counties, California. Type locality: summit of the Trinity Mountains, California. June–July.

16. *Grossularia Victoris* (Greene) Cov. & Britt. Victor's Gooseberry. Fig. 2347.*Ribes Victoris* Greene, Pittonia 1: 224. 1888.*Ribes Menziesii* var. *Victoris* Jancz. Mém. Soc. Genève 35: 363. 1907.*Ribes Menziesii* var. *minus* Jancz. loc. cit.*Ribes Victoris* var. *minus* Jepson, Man. Fl. Pl. Calif. 474. 1925.

Shrub 2 m. high or less; nodal spines acicular, widely divergent; young twigs puberulent and somewhat viscid, varying from densely bristly to smooth. Leaves 5 cm. wide or less, loosely glandular-hairy and also often sparingly pubescent on both surfaces; peduncles slender, glandular-pubescent, 1–2-flowered; hypanthium 3 mm. long and about as broad, greenish white, densely glandular; sepals white, 6–11 mm. long, recurved; ovary glandular-pubescent; berry golden yellow, densely covered with weak gland-tipped bristles.

Wooded canyon slopes, Transition and Upper Sonoran Zones; North Coast Ranges in Marin, Sonoma, and Napa Counties, California. Type locality: near the base of Mount Tamalpais, California. April.

*Grossularia Greenei*ana (Heller) Cov. & Britt. N. Amer. Fl. 22: 212. 1908. (*Ribes Greeneianum* Heller, Muhlenbergia 1: 111. 1905; *Ribes Victoris* var. *Greeneianum* Jepson, Man. Fl. Pl. Calif. 474. 1925.) Shrub, 3.5 m. high or less; nodal spines acicular; young twigs densely bristly, the bristles deciduous leaving the branches glabrous. Leaves 2–4 cm. wide, glandular-hairy on both surfaces and pubescent; hypanthium 3 mm. long and about as broad, white, glandular-pubescent; peduncle 3–4 mm. long, glandular and pubescent; sepals as long as the sepals or a little longer; ovary densely glandular-hairy; berry about 1.5 cm. long, densely covered with weak gland-tipped bristles. Wooded canyons, Upper Sonoran Zone; eastern slopes of the Vaca Mountains, California. Type locality: Vacaville, Solano County, California. Closely related to *G. Victoris* and best distinguished by the longer filaments.

17. *Grossularia senilis* Coville. Santa Cruz Gooseberry. Fig. 2348.*Grossularia senilis* Coville, N. Amer. Fl. 22: 214. 1908.*Ribes Menziesii* var. *senile* Jepson, Man. Fl. Pl. Calif. 473. 1925.

Shrub 2 m. high or less; nodal spines 3, acicular; twigs densely or thinly bristly. Leaves 4 cm. wide or less, thin, sparsely villous and glandular-hairy above or nearly glabrous, soft-pubescent beneath with intermingling gland-tipped hairs; petioles glandular-pubescent; peduncles glandular-hairy and villous, 1–2-flowered; ovary densely white-villous with a few gland-tipped or glandless bristles; hypanthium 4–5 mm. long, cylindric-campanulate, pubescent; sepals twice the length of the hypanthium, purple, villous and glandular-hairy; petals half the length of the sepals or more; anthers mucronate.

Wooded slopes, Upper Sonoran and Humid Transition Zones; Santa Cruz Mountains, California. Type locality: near Saratoga, California. April–May.

18. *Grossularia Menziesii* (Pursh) Cov. & Britt. Canyon Gooseberry. Fig. 2349.*Ribes Menziesii* Pursh, Fl. Amer. Sept. 732. 1814.*Ribes ferox* Smith in Rees, Cycl. 30: No. 26. 1815.*Ribes subvestitum* Hook. & Arn. Bot. Beechey 346. 1838.

Shrub 2 m. high or less; nodal spines acicular; young twigs pubescent and densely bristly. Leaves 4 cm. wide or less, thickish rugose at maturity, glabrous or with a few scattered glandular hairs above, velvety pubescent with intermingled glandular hairs beneath; petiole slender,

pubescent and glandular-hairy; peduncles 1-2-flowered, pubescent and glandular; hypanthium 2-3 mm. long and about as broad, purple, glandular-pubescent; sepals purple, 7-11 mm. long, oblong and blunt; ovary glandular-bristly or the larger bristles often without glands; stamens about equaling the sepals; berry globose, bristly, about 1 cm. in diameter.

Along ravines and on wooded slopes, Humid Transition Zone; near the coast from southern Oregon to middle California. Type locality: Trinidad, Humboldt County, California. April-May.

19. *Grossularia Hystrix* (Eastw.) Cov. & Britt. Porcupine Gooseberry. Fig. 2350.

Ribes hystrix Eastw. Proc. Calif. Acad. III. 2: 248. 1902.

Grossularia Hystrix Cov. & Britt. N. Amer. Fl. 22: 213. 1908.

Ribes Menziesii var. *hystrix* Jepson, Man. Fl. Pl. Calif. 473. 1925.

Shrub about 2 m. high or less; nodal spines stout, 1-2.5 cm. long; young branches tortuous, densely bristly with yellowish bristles. Leaves thin, 2-5 cm. wide, glabrous or sparsely pubescent above when young, sparsely and finely pubescent beneath and glandular with sessile or very short-stalked glands; petioles whitish-pubescent with intermingling stalked glands; peduncles about as long as the petioles and with similar pubescence, 1-3-flowered; hypanthium about 4 mm. long, nearly campanulate, purple, pubescent and glandular; sepals about twice the length of the hypanthium, greenish purple, glandular-hairy and villous especially at the apex; berry purple, densely bristly.

Wooded canyon slopes, Upper Sonoran and Arid Transition Zones; Santa Lucia Mountains, California. Type locality: Gorda, Santa Lucia Mountains, California. April-May.

20. *Grossularia leptosma* Coville. Bay Gooseberry. Fig. 2351.

Grossularia leptosma Coville, N. Amer. Fl. 22: 214. 1908.

Ribes Menziesii var. *leptosma* Jepson, Man. Fl. Pl. Calif. 474. 1925.

Shrub 1.5 m. high or less, the branches especially the young shoots densely or sometimes rather sparsely bristly; nodal spines 3, acicular, 1-2 cm. long. Leaves rather thin, not rugose, 2-5 cm. wide, sparsely pubescent or glabrous above, pubescent beneath and glandular with almost sessile glands or sometimes with stalked ones on the veins; petioles and peduncles pubescent and glandular-hairy; flowers 1-3; ovary densely covered with gland-tipped bristles; hypanthium 2.5-3.5 mm. long, greenish purple, pubescent with intermingling gland-tipped hairs; sepals 10-12 mm. long, purple or tinged with purple, lanceolate; berry subglobose, about 15 mm. in diameter, densely covered with gland-tipped bristles.

Wooded canyon slopes, Humid Transition and Upper Sonoran Zones; Coast Ranges from Sonoma County to Santa Clara County, California. Type locality: Bear Valley, Marin County, California. March-April.

21. *Grossularia californica* (Hook. & Arn.) Cov. & Britt. Hillside Gooseberry. Fig. 2352.

Ribes californicum Hook. & Arn. Bot. Beechey 346. 1838.

Ribes occidentale Hook. & Arn. loc. cit.

Ribes oligacanthum Eastw. Proc. Calif. Acad. III. 2: 246. 1902.

Ribes occidentale var. *californicum* Jancz. Mém. Soc. Genève 35: 368. 1907.

Grossularia californica Cov. & Britt. N. Amer. Fl. 22: 214. 1908.

Shrub 1.5 m. high or less; bristles none; nodal spines usually 3, rather stout, 15 mm. long or less; young shoots glabrous. Leaves 3 cm. wide or less, thin, glabrous or nearly so on both surfaces, glossy green above; petioles glabrous or sometimes sparingly glandular-pubescent; peduncles glabrous or sometimes sparsely pubescent and with a few stalked glands; ovary bristly, the shorter bristles sometimes gland-tipped; hypanthium 2 mm. long or less, glabrous; sepals 6-8 mm. long, lanceolate, green or slightly tinged with purple, glabrous or puberulent; stamens equaling the sepals; berry globose, densely or thinly covered with bristles.

Open or sparsely wooded hillsides, Upper Sonoran Zone; Coast Ranges, Mendocino County to Monterey County, California. Type locality: California. Feb.-March.

22. *Grossularia hesperia* (McClatchie) Cov. & Britt. Southern California Gooseberry. Fig. 2353.

Ribes hesperium McClatchie, Erythea 2: 79. 1894.

Ribes occidentale var. *hesperium* Jancz. Mém. Soc. Genève 35: 368. 1907.

Grossularia hesperia Cov. & Britt. N. Amer. Fl. 22: 215. 1908.

Ribes californicum var. *hesperium* Jepson, Man. Fl. Pl. Calif. 473. 1925.

Shrub, 2 m. high or less; bristles none; nodal spines stout, subulate, straight or curved, 16 mm. long or less; young shoots glabrous. Leaves 4.5 mm. wide or less, thin, puberulent on both surfaces and with minute sessile glands beneath; petioles slender, puberulent; peduncles 1-2-flowered, puberulent; ovary densely bristly, the shorter bristles sometimes gland-tipped; hypanthium 2-3 mm. long, puberulent, green or tinged with purple; sepals narrowly lanceolate, 7-9 mm. long, green or tinged with purple, puberulent; petals about half as long as the sepals; berry densely covered with stout bristles.

Canyon slopes, Upper Sonoran Zone; mountains of southern California. Type locality: canyons of the San Gabriel Mountains. Dec.-March.

23. *Grossularia cruenta* (Greene) Cov. & Britt. Coast Ranges Gooseberry.

Fig. 2354.

Ribes cruentum Greene, Pittonia 4: 35. 1899.*Ribes amictum* var. *cruentum* Jancz. Mém. Soc. Genève 35: 366. 1907.*Grossularia cruenta* Cov. & Britt. N. Amer. Fl. 22: 215. 1908.*Ribes Roetzlii* var. *cruentum* Jepson, Man. Fl. Pl. Calif. 472. 1925.

Shrub with spreading branches, mostly less than 1 m. long; bristles none; nodal spines 3, acicular, 15 mm. long or less; young shoots glabrous or puberulent. Leaves 2.5 cm. wide or less, glabrous; petioles slender, usually shorter than the blades, glabrous or sometimes puberulent when young; peduncles 1-2-flowered; ovary bristly and sometimes with a few stalked glands; hypanthium 5-7 mm. long, broadly cylindrical, reddish purple, glabrous or puberulent; sepals lanceolate, reddish purple; berry densely covered with spines, reddish.

Wooded slopes, Arid Transition Zone; Siskiyou Mountains, southern Oregon, south through the Coast Ranges to Sonoma County, California. Type locality: California Coast Ranges, from Sonoma County northward. April-June. Bleeding Flower.

24. *Grossularia Roetzlii* (Regel) Cov. & Britt. Sierra Gooseberry. Fig. 2355.*Ribes Roetzlii* Regel, Gartenfl. 28: 226. 1879.*Ribes amictum* Greene, Pittonia 1: 69. 1887.*Ribes Wilsonianum* Greene, Erythea 3: 70. 1895.*Grossularia Roetzlii* Cov. & Britt. N. Amer. Fl. 22: 215. 1908.

Shrub mostly less than 1 m. high, the branches spreading; bristles none; nodal spines acicular, 15 mm. long or less, brownish; young twigs slender, pubescent. Leaves 2.5 cm. wide or less, thin, short-pubescent on both surfaces or sometimes nearly glabrous above; petioles slender, short-pubescent and sometimes with a few short-stalked glands; peduncles 1-3-flowered, short-pubescent and with a few short-stalked glands; ovary white-hairy and bristly; hypanthium 5-7 mm. long, pubescent, purple; sepals lanceolate, 7-10 mm. long, purple; berry globose, light reddish purple, clothed with stout spines, these and the body of the fruit pubescent.

Open coniferous forests, Arid Transition Zone; Trinity Mountains and Mount Shasta region south through the Sierra Nevada to southern California. Type locality: western North America. May-June.

25. *Grossularia amara* (McClatchie) Cov. & Britt. Bitter Gooseberry. Fig. 2356.*Ribes amarum* McClatchie, Erythea 2: 79. 1894.*Ribes mariposanum* Congdon, Erythea 7: 183. 1900.*Ribes Menziesii* var. *amarum* Jancz. Mém. Soc. Genève 35: 363. 1907.*Grossularia amara* Cov. & Britt. N. Amer. Fl. 22: 216. 1908.

Shrub 2 m. high or less, the young twigs pubescent or puberulent and glandular, the older ones smooth and brown; nodal spines 1 cm. long or less, brown. Leaves 4 cm. wide or less, pubescent and more or less glandular-puberulent on both surfaces; petioles and peduncles glandular-pubescent; ovary densely glandular-bristly; hypanthium 5-6 mm. long, purplish, pubescent and with stalked glands; sepals lanceolate, purple, pubescent, about half as long as the hypanthium; berry densely covered with short gland-tipped bristles, subglobose, 15-20 mm. in diameter.

Wooded canyons, mainly Upper Sonoran Zone; Sierra Nevada, Mariposa County, south to southern California. Type locality: canyons of the San Gabriel Mountains, California. March-April.

26. *Grossularia speciosa* (Pursh) Cov. & Britt. Garnet Gooseberry. Fig. 2357.*Ribes speciosum* Pursh, Fl. Amer. Sept. 731. 1814.*Ribes stamineum* Smith in Rees, Cycl. 30: No. 30. 1815.*Ribes fuchsoides* Moc. & Sesse ex Berland. Mém. Soc. Genève 32: 58. 1826.*Robsonia speciosa* Spach, Hist. Veg. 6: 181. 1838.*Grossularia speciosa* Cov. & Britt. N. Amer. Fl. 22: 212. 1908.

Shrub 3 m. high or less, the branches bristly; nodal spines 3, stout and rigid, 1-2 cm. long. Leaves coriaceous, dark glossy green, semi-evergreen, glabrous or sparingly glandular, 1-4 cm. long; peduncles drooping; pedicels slender, glandular-bristly; hypanthium 2-3 mm. long, glandular-bristly; sepals 4, not reflexed, 6-10 mm. long, bright red; filaments 2-4 times as long as the sepals, red; berry glandular-bristly.

Wooded canyons and hillsides, Upper Sonoran Zone; Coast Ranges from Santa Clara County to San Diego County, California. Type locality: California. March-May.

Family 62. PLATANACEAE.**PLANE-TREE FAMILY.**

Large trees, with thin exfoliating bark and watery sap. Leaves alternate, deciduous, petioled, palmately lobed. Stipules thin sheathing, entire or toothed. Flowers minute, bracted, monoecious, in dense pedunculate heads. Calyx minute, of 3-8 minute scale-like sepals. Petals minute, 3-6. those of the pistillate flowers



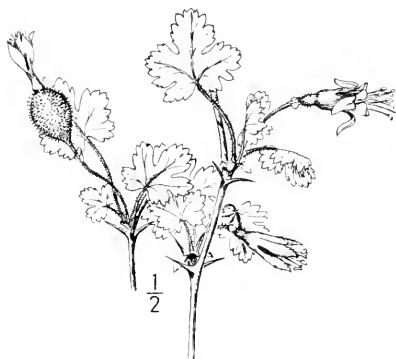
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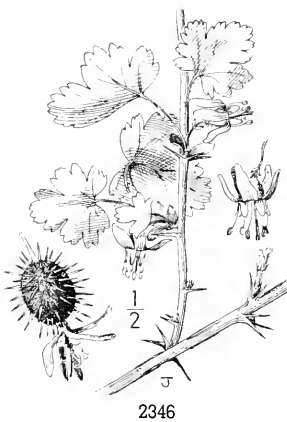
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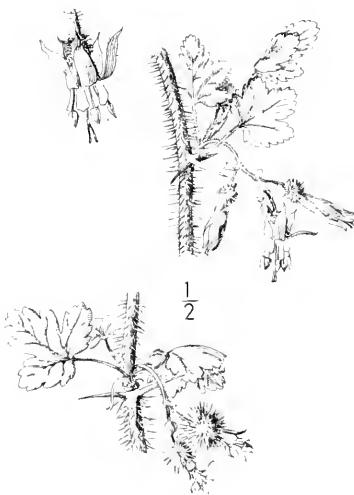
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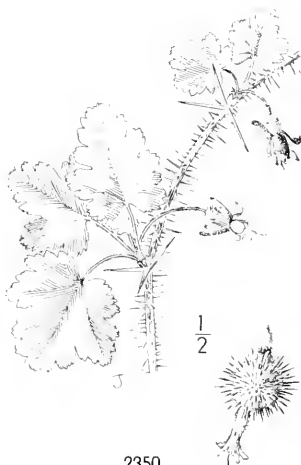
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2342. *Grossularia Watsoniana*
2343. *Grossularia tularensis*
2344. *Grossularia sericea*

2345. *Grossularia Lobbii*
2346. *Grossularia Marshallii*
2347. *Grossularia Victoris*

2348. *Grossularia senilis*
2349. *Grossularia Menziesii*
2350. *Grossularia Hystrix*



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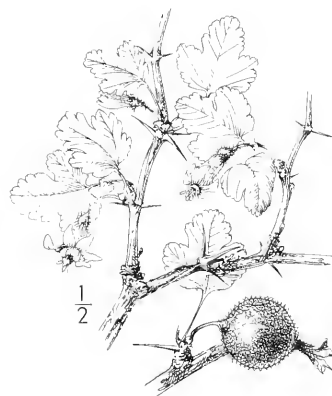
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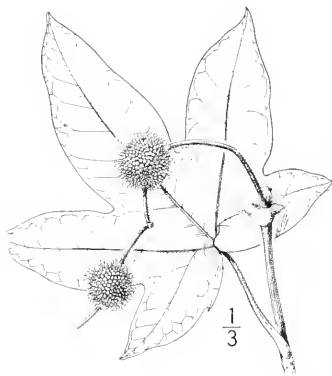
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2351. *Grossularia leptosma*
 2352. *Grossularia californica*
 2353. *Grossularia hesperia*

2354. *Grossularia cruenta*
 2355. *Grossularia Roezlii*
 2356. *Grossularia amara*

2357. *Grossularia speciosa*
 2358. *Platanus racemosa*
 2359. *Crossosoma californicum*

rounded. Carpels as many as sepals, 1-celled, surrounded by persistent hairs, and a few staminodia. Style terminal, with the stigmatic surface on the ventral suture. Ovule 1 or rarely 2, orthotropous. Fruit a dense globose head of achenes, with intermingling hairs and staminodia. Seeds pendulous; endosperm fleshy; embryo axial, straight.

Comprising a single genus. An ancient genus, with a number of fossil species extending back to the Cretaceous. Its relationship to other plant families is little understood.

1. PLÁTANUS [Tourn.] L. Sp. Pl. 999. 1753.

Characters of the family. [Name, ancient.]

A genus of 9 living species inhabiting the north temperate regions. Besides the following species, *P. Wrightii* S. Wats. occurs in Arizona, New Mexico, and adjacent Mexico, *P. occidentalis* L. in the eastern and southern United States, and five other species in Mexico. Type species, *P. orientalis* L.

1. *Platanus racemosa* Nutt. California Plane-tree, Sycamore. Fig. 2358.

Platanus racemosa Nutt. N. Amer. Sylva 1: 47. 1842.

Platanus californica Benth. Bot. Sulph. 54. 1844.

A large widely branching tree, 10–25 m. high, with a trunk 1–1.5 m. in diameter; young twigs densely stellate-tomentose, becoming glabrous and light brown the second year. Leaves stellate-pubescent when young, usually glabrate in age, 10–15 cm. broad and scarcely as long, palmately 5-lobed, rarely 3-lobed, truncate to below the middle or subcordate at base; lobes acute, cuspidate; petioles shorter than the leaf-blades; stipules large on young twigs; staminate heads several, 8–10 mm. in diameter; pistillate heads 3–5; 2–2.5 cm. in diameter in fruit.

Along watercourses in the foothills and valleys, Upper Sonoran Zone; upper Sacramento Valley and the interior valleys of the Coast Ranges south to northern Lower California. Type locality: vicinity of Santa Barbara, California. Feb.–April.

Family 63. CROSSOSOMATACEAE.

CROSSOSOMA FAMILY.

Glabrous shrubs, with alternate entire leaves. Flowers perfect, regular, solitary, terminating short naked or leafy-bracted peduncles. Hypanthium turbinate-campanulate, lined with a thin glandular disk. Sepals 5, broad, persistent, reflexed or spreading in fruit. Petals 5, white, deciduous, attached to the rim of the hypanthium. Stamens 15–50, inserted in several series on the thin disk lining the hypanthium; filaments slightly dilated at base; anthers basifixed. Pistils 2–9, unicarpellate; ovules several, anatropous; stigma capitate. Fruit composed of 2–9 follicles, sessile or short-stipitate. Seeds several with a conspicuous fringed aril; endosperm present; embryo curved.

One genus and three or four species inhabiting southwestern United States and northern Mexico.

1. *CROSSOSOMA* Nutt. Journ. Acad. Phila. II. 1: 150. 1847.

Characters of the family. [Name Greek, meaning fringe and body, in reference to the fringed aril.] Type species, *Crossosoma californicum* Nutt.

Petals broadly obovate or orbicular-obovate, scarcely clawed; follicles many-seeded.

1. *C. californicum*.

Petals spatulate to oblong, distinctly clawed; follicles few-seeded.

2. *C. Bigelovii*.

1. *Crossosoma californicum* Nutt. Catalina Crossosoma. Fig. 2359.

Crossosoma californicum Nutt. Journ. Acad. Phila. II. 1: 150. 1847.

Shrub, 1–5 m. high with rather stout, grayish-brown branches. Leaves scattered, oblong, 2–7 cm. long, acutish or obtuse and mucronate at the apex, narrowed at base to a very short petiole, pale green on both surfaces; sepals round-ovate, 7–8 mm. long; petals suborbicular, about 12 mm. long, spreading; stamens 40–50; follicles 3–7, rarely 9, about 15 mm. long, 3 mm. thick, more or less recurved; seeds 20–25, 3 mm. in diameter, shining.

Hillides and canyons, Upper Sonoran Zone; Santa Catalina and San Clemente Islands, southern California; also on Guadalupe Island, Lower California. Type locality: Santa Catalina Island. Feb.–April.

2. *Crossosoma Bigelovii* S. Wats. Bigelow's Crossosoma. Fig. 2360.

Crossosoma Bigelovii S. Wats. Proc. Amer. Acad. 11: 122. 1876.

Straggly shrub, 1–2 m. high, with rather slender spreading branchlets bearing scattered leaves and also short stubby ones bearing fascicles of leaves. Leaves elliptic to oblong-obovate, 10–15 mm. long, firm, apiculate, gray-green; sepals 4 mm. long and about as broad; petals

7-8 mm. long, broadly spatulate, narrowed to a distinct claw; follicles 1-3, 6-10 mm. long; seeds 2-5.

Canyons of the desert ranges, Lower Sonoran Zone; Ord Mountains, Mojave Desert, California, to north-western Arizona, northern Lower California, and Sonora, Mexico. Type locality: "mouth of Bill Williams River, W. Arizona." Feb.-April.

Family 64. ROSACEAE.

ROSE FAMILY.

Herbs, shrubs, or trees, with alternate or rarely opposite, simple or compound, commonly stipulate leaves. Hypanthium free from the ovary, naked or sometimes bearing bractlets. Disk adnate to the base of the hypanthium. Sepals 5, rarely 4, appearing as if lobes of the calyx-like hypanthium. Petals distinct, attached to the rim of the hypanthium and alternating with the sepals, rarely wanting. Stamens distinct, usually numerous and commonly in three series. Carpels one to many, usually completely separate, free from the hypanthium. Style terminal or lateral or rarely basal. Ovary 1-celled or rarely imperfectly 2-celled; ovules one to several, anatropous or sometimes amphitropous or orthotropous. Fruit follicles, achenes, or more or less aggregate drupelets.

A family of about 75 genera and over 1,200 species, of wide geographic distribution.



2360. *Crossosoma Bigelovii*
2361. *Lyonothamnus floribundus*

2362. *Physocarpus capitatus*
2363. *Physocarpus malvaceus*

2364. *Physocarpus alternans*
2365. *Spiraea densiflora*

Fruit of 1–5 dehiscent follicles.

Carpels alternate with the sepals or fewer in number; stipules none or deciduous. (*Spiraeaceae*)

Leaves opposite; tree.

1. *Lyonothamnus*.

Leaves alternate; herbs or shrubs.

Carpels 1–5, when more than 1, united below; endosperm present.

2. *Physocarpus*.

Carpels usually 5, distinct; endosperm none.

Flowers perfect; leaves simple; plants more or less woody.

Leaves entire or toothed; filaments distinct.

Leaves deciduous; carpels dehiscent on the ventral suture.

3. *Spiraea*.

Leaves persistent; carpels dehiscent on both sutures.

4. *Petrophytum*.

Leaves twice or thrice 3-cleft; filaments united at base.

5. *Luetkea*.

Flowers dioecious; leaves twice or thrice compound; tall herbs.

6. *Aruncus*.

Carpels opposite the sepals; stipules present and persistent; leaves pinnately dissected. (*Sorbariaceae*)

7. *Chamaebatiaria*.

Fruit of indehiscent achenes or drupelets.

Carpels not enclosed by a fleshy hypanthium.

Carpels becoming dry achenes (inserted on a fleshy colored receptacle in *Fragaria*).

Ovaries 2-ovuled, the ovules one above the other; achenes usually 1-seeded and arranged in a single circle.

Shrubs with simple leaves; hypanthium hemispheric. (*Holodisceae*)

8. *Holodiscus*.

Perennial herbs, with pinnately dissected leaves. (*Ulmariaceae*)

9. *Filipendula*.

Ovaries 1-ovuled; achenes if many, spirally arranged.

Leaves and branches alternate; disk at the mouth of the hypanthium annular or wanting.

Styles articulate with the ovary and deciduous. (*Potentilleae*)

Stamens numerous, rarely 5 in *Ivesia*.

Receptacle not enlarged in fruit.

Stamens inserted on the hypanthium some distance above the receptacle, without an annular thickening at the base of the filaments; petals usually white, rarely pale yellow.

Stamens 10 or 20; filaments dilated.

10. *Horkelia*.

Stamens 5–20; filaments filiform.

11. *Ivesia*.

Stamens inserted very near the base of the receptacle on a more or less evident annular thickening; petals yellow, rarely white.

12. *Potentilla*.

Receptacle enlarged in fruit and becoming spongy or fleshy and red; style lateral; ovules ascending, amphitropous; leaves trifoliolate.

Petals yellow; receptacle spongy.

13. *Duchesnea*.

Petals white; receptacle juicy.

14. *Fragaria*.

Stamens 5; leaves trifoliolate.

15. *Sibbaldia*.

Styles not articulate with the ovary, persistent.

Ovules anatropous or amphitropous, inserted at the point where the style arises, pendulous or when the style is subbasal, ascending; radicle superior.

Herbs; petals none except in *Agrimonia*. (*Sanguisorbieae*)

Hypanthium not prickly.

Flowers minute, cymosely clustered; hypanthium bracteolate, urceolate, loosely investing the achenes in fruit.

16. *Alchemilla*.

Flowers spicate or capitate; hypanthium not bracteolate, 4-angled, indurate in fruit; sepals petaloid.

17. *Sanguisorba*.

Hypanthium prickly.

Prickles on the hypanthium barbed; petals none.

18. *Acaena*.

Prickles on the hypanthium hooked; petals present.

19. *Agrimonia*.

Shrubs with minute simple leaves and paniculate flowers; style doubly bent. (*Adenostomateae*)

20. *Adenostoma*.

Ovules orthotropous, inserted at the base of the ovary; radicle inferior.

Hypanthium hemispheric to turbinate, persistent. (*Dryadeae*)

Pistils several to many.

Leaves simple, entire or crenate; flowers 8–10-merous; depressed under-shrubs.

21. *Dryas*.

Leaves compound, except in *Cowania*; flowers 5-merous.

Perennial herbs; sepals valvate; leaves pinnate.

Style conspicuously bent and geniculate above, upper portion usually hairy and readily deciduous.

22. *Geum*.

Style neither conspicuously bent nor geniculate, upper portion glabrous, persistent or tardily deciduous.

23. *Sieversia*.

Shrubs; sepals imbricate; leaves small, pinnatifid.

Bractlets present; pistils numerous.

24. *Fallugia*.

Bractlets absent; pistils few.

25. *Cowania*.

Pistil usually solitary; shrubs.

Leaves small, 3-lobed; sepals imbricate.

26. *Purshia*.

Leaves thrice pinnatifid; sepals valvate.

27. *Chamaebatia*.

Hypanthium salverform, the tube cylindric, persistent, the limb saucer-shaped, deciduous. (*Cercocarpeae*)

28. *Cercocarpus*.

Leaves and branches opposite; disk at the mouth of the hypanthium forming a cylindric tube separating the stamens from the pistils; shrubs. (*Coleogyneae*)

29. *Coleogyne*.

Carpels becoming drupelets, few to many; ovules 2, collateral; stamens few to many, inserted on the margin of the flat or saucer-shaped hypanthium; plants often prickly. (*Rubeae*)

30. *Rubus*.

Carpels enclosed in the hypanthium, which becomes fleshy and usually colored in fruit. (*Roseae*)

31. *Rosa*.

1. LYONOTHÁMNUS A. Gray, Proc. Amer. Acad. 20: 291. 1885.

Trees with reddish brown shreddy bark. Leaves opposite, persistent, simple and entire, pinnatifid or pinnately compound. Flowers in terminal compound cymes, perfect. Hypanthium hemispheric, free from the ovary. Sepals 5, persistent. Petals 5, clawless. Stamens 15, borne on the disk lining the hypanthium. Pistils 2, 1-celled. Style stout, stigma small. Ovules 4 in each ovary, pendulous. Fruit a pair of follicles; seeds 4, oblong. [Name for the discoverer, W. S. Lyon, and Greek for shrub.]

A monotypic genus restricted to the islands of southern California.

1. *Lyonothamnus floribundus* A. Gray. Catalina Ironwood. *Lyonothamnus*. Fig. 2361.

Lyonothamnus floribundus A. Gray, Proc. Amer. Acad. 20: 292. 1885.

Evergreen tree, 5–15 m. high, with a rather narrow crown and reddish brown shreddy bark; young twigs pubescent. Leaves evergreen, firm, oblong-lanceolate, 10–15 cm. long, entire, crenate-serrate, or occasionally lobed below, short-petioled, tomentose or glabrate beneath, dark glossy green above; cyme 1–2 dm. broad, densely many-flowered; hypanthium densely tomentose; petals white, suborbicular, 4–5 mm. long; follicles glandular-pubescent.

Canyon slopes, Upper Sonoran Zone; restricted to Santa Catalina Island, southern California. May–July.

Lyonothamnus floribundus var. *asplenifolius* (Greene) Brandg. Zoe 1: 136. 1890. (*Lyonothamnus asplenifolius* Greene, Bull. Calif. Acad. 1: 187. 1885.) Leaves pinnately divided into 3–7 leaflets, these oblong-lanceolate, pinnatifid into broad oblique lobes with narrow sinuses. Santa Rosa, Santa Cruz, and San Clemente Islands, intergrades with the typical form on Santa Catalina. The variety is a unique and attractive ornamental tree.

2. PHYSOCÁRPUS Maxim. Act. Hort. Petrop. 6: 219. 1879.

Shrubs with exfoliating bark and petioled palmately lobed leaves. Flowers in terminal corymbs. Hypanthium campanulate, 5-lobed, stellate-pubescent. Petals 5, white, spreading. Stamens 20–40, inserted on a disk, in the throat of the hypanthium. Pistils 1–5, more or less united at the base; styles elongated; stigmas capitate. Follicles inflated, at length deciduous along both sutures. Seeds 2–4, ovoid, with a bony shining coat; endosperm copious. [Greek, meaning bellows or bladder, and fruit.]

Species about 10, one in Manchuria, the others in North America. Type species, *Physocarpus amurensis* Maxim.

Pistils 2–5; stamens similar.

Follicles 3–5, united at the base, glabrous.

Follicles 2, united half their length, or only 1, stellate.

Pistil 1; alternating stamens long and their filaments more dilated.

1. *P. capitatus*.

2. *P. malvaceus*.

3. *P. alternans*.

1. *Physocarpus capitatus* (Pursh) Kuntze. Pacific Ninebark. Fig. 2362.

Spiraea capitata Pursh, Fl. Amer. Sept. 342. 1814.

Physocarpa tomentosa Raf. New Fl. 3: 74. 1838.

Neillia opulifolia var. *mollis* Brewer & Wats. Bot. Calif. 1: 171. 1876.

Neillia capitata Greene, Pittonia 2: 28. 1889.

Physocarpus capitatus Kuntze, Rev. Gen. Pl. 2: 219. 1891.

Opulaster opulifolius var. *capitatus* Jepson, Fl. W. Mid. Calif. 276. 1901.

Opulaster cordatus Rydb. N. Amer. Fl. 22: 242. 1908.

Shrub with erect or surculose branches, 1–5 m. high. Leaves broadly round-ovate, 3–5-lobed, the lobes incised or doubly serrate, truncate to cordate at base, glabrous or slightly pubescent above, stellate-pubescent or glabrous beneath, 3–6 cm. long, on petioles 1–2 cm. long; corymbs hemispherical, densely flowered; pedicels and hypanthium densely stellate; petals 3 mm. long; follicles 3–5, glabrous or more or less stellate.

Stream banks and rocky slopes, Transition and Canadian Zones; southern British Columbia and Idaho, south to the Sierra Nevada and California Coast Ranges as far as Santa Barbara County. Type locality: northwest coast of America. May–Sept.

2. *Physocarpus malvaceus* (Greene) Kuntze. Mallow-leaved Ninebark. Fig. 2363.

Spiraea opulifolia var. *pauciflora* Torr. & Gray, Fl. N. Amer. 1: 414. 1840.

Neillia malvacea Greene, Pittonia 2: 30. 1889.

Physocarpus malvaceus Kuntze, Rev. Gen. Pl. 219. 1891.

Opulaster malvaceus Kuntze, Rev. Gen. Pl. 949. 1891.

Physocarpus pauciflorus Piper, Fl. Palouse Reg. 94. 1901.

Shrub, 1–2 m. high, with stellate or glabrous, brown branches. Leaves round-ovate, 3–5-lobed and more or less doubly crenate-serrate, 2–6 cm. long, usually cordate at base, stellate-pubescent on both surfaces or sometimes glabrous; petioles 1–2 cm. long; pedicels and hypanthium densely stellate; corymbs hemispherical, 3–5 cm. broad; petals rounded, 4–5 mm. long; follicles 2, united nearly two-thirds their length.

Stream banks and moist hillsides, Transition and Canadian Zones; British Columbia to Oregon, Montana, and Utah. Type locality: shores of Lake Pend Oreille, northern Idaho. June–Sept.

3. *Physocarpus alternans* (M. E. Jones) J. T. Howell. Nevada Ninebark.

Fig. 2364.

Neillia monogyna var. *alternans* M. E. Jones, Zoe 4: 42. 1893.*Opulaster alternans* Heller, Cat. N. Amer. Pl. ed. 2. 5. 1900.*Physocarpus alternans* J. T. Howell, Proc. Calif. Acad. IV. 20: 130. 1931.

Densely branched shrub 5–15 dm. high, bark shreddy, tawny or grayish white, young twigs stellate-pubescent. Leaves 5–18 mm. broad, suborbicular, cordate, 3–7-lobed, the lobes doubly crenate, rather thinly short-pubescent with stellate hairs on both surfaces; petioles and pedicels stellate-pubescent, 5–10 mm. long; corymbs 3–12-flowered; hypanthium stellate on the back, glabrous within, 3–4 mm. broad; sepals ovate, 3 mm. long, stellate on the back, less so within; petals suborbicular, 3–4 mm. long; stamens about 20, alternating ones longer and with more dilated filaments; follicle solitary, about 5 mm. long, densely stellate-pubescent.

Rocky canyon slopes, Arid Transition and Canadian Zones; White Mountains, Inyo County, California, eastward through central Nevada to the Wasatch Mountains, Utah. Type locality: Duck Creek, altitude 7,300 feet, Schell Creek Mountains, Nevada. June–Aug.

Physocarpus alternans subsp. *panamintensis* J. T. Howell, op. cit. 132. Upper surfaces of the leaves densely stellate-pubescent, instead of thinly so. Otherwise like the typical species. Panamint Mountains, Inyo County, California. Type locality: on saddle between Johnson and Surprise Canyons, altitude 8,500 feet.

Physocarpus alternans subsp. *annulatus* J. T. Howell, op. cit. 133. Essentially the same as the typical species except for a ring of hairs near the top of the hypanthium on the inner surface. Described from plants collected on Wyman Creek, altitude 8,500 feet, White Mountains, Inyo County, California. Plants collected in Marble Canyon of Black Canyon in the same mountain range are without this hairy ring, so the character seems to have little taxonomic significance.

3. *SPIRAEA* L. Sp. Pl. 489. 1753.

Shrubs with simple usually serrate leaves without stipules, and corymbose, racemose or paniculate inflorescence. Flowers perfect. Hypanthium campanulate or turbinate. Sepals 5. Petals 5, white or rose-colored. Stamens 15–70, inserted in one to several series under the margin of the disk. Pistils 3–8, usually 5; ovules 2 to several. Follicles not inflated, opening along the ventral side. Seeds tapering at both ends, pendulous; endosperm scanty or none. [Greek, meaning twisted, the follicles twisted in some species.]

About 70 species, natives of the north temperate zone. Type species, *Spiraea salicifolia* L.

Panicle flat-topped; sepals not reflexed.

Petals rose-colored.

Petals white.

Panicles elongated; sepals soon reflexed.

Leaves green and glabrous or nearly so beneath.

Leaves white-tomentose beneath.

1. *S. densiflora*.2. *S. lucida*.3. *S. Menziesii*.4. *S. Douglasii*.

1. *Spiraea densiflora* Nutt. Rose-colored Meadow-sweet. Fig. 2365.

Spiraea densiflora Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 414. 1840.*Spiraea Helleri* Rydb. Fl. N. Amer. 22: 248. 1908.

A low shrub with ascending branches, 2–6 dm. high, glabrous throughout or with a few hairs on the leaf margins. Leaves oval or elliptical, rounded at both ends, 1.5–3 cm. long, crenate or serrate above the middle; inflorescence flat-topped or rounded, 2–4 cm. broad;



2366

2366. *Spiraea lucida*

2367

2367. *Spiraea Menziesii*

2368

2368. *Spiraea Douglasii*

hypanthium glabrous; sepals ovate-obtuse; petals rose-colored, 1.5 mm. long, obovate; follicles oblanceolate, about 4 mm. long including the short beak, glabrous and shining.

Rocky ridges, Boreal Zones; British Columbia to Oregon. Type locality: Blue Mountains, Oregon. June–Aug.

Spiraea densiflora subsp. *splendens* (Baumann) Abrams. (*Spiraea betulifolia* var. *rosea* A. Gray, Proc. Amer. Acad. 8: 381. 1872. *Spiraea splendens* Baumann ex K. Koch, Monats. Ver. Bef. Gart. Preuss. 18: 294. 1875. *Spiraea arbuscula* Greene, Erythra 3: 63. 1895.) Distinguished from the typical species by the finely puberulent twigs, petioles, hypanthiums and veins on the under surface of the leaves. This subspecies is the common form in the southern Cascades, Oregon, and in the Sierra Nevada, California.

2. *Spiraea lucida* Dougl. Shiny Spiraea. Fig. 2366.

Spiraea lucida Dougl. ex Hook. Fl. Bor. Amer. 1: 172, as a synonym. 1832; Greene, Pittonia 2: 221. 1892.

Spiraea betulifolia Hook. Fl. Bor. Amer. 1: 172. 1832. Not Pall. 1784.

Spiraea corymbosa var. *lucida* Zabel, Handb. Laubb. Deuts. Dendr. Ges. 157. 1903.

A low shrub, with creeping rootstock, and erect glabrous stems and branches, 3–10 dm. high. Leaves obovate or oval, 2–6 cm. long, glabrous, shining above, coarsely and irregularly serrate; panicle flat-topped, 3–10 cm. broad; hypanthium glabrous; sepals about 1 mm. long; petals white, orbicular, 2 mm. long; follicles glabrous and shining.

Along mountain streams, Boreal Zones; British Columbia to Oregon, Wyoming, and Montana. Type locality: valleys of the Rocky Mountains. June–Aug.

3. *Spiraea Menziesii* Hook. Menzies' Spiraea. Fig. 2367.

Spiraea Menziesii Hook. Fl. Bor. Amer. 1: 173. 1832.

Spiraea cuneifolia Raf. New Fl. 3: 67. 1838.

Spiraea Douglasii var. *Menziesii* Presl, Epimel. Bot. 195. 1852.

A low shrub with erect branches, 8–20 dm. high. Leaves elliptical, 3–5 cm. long, short-petioled, serrate above the middle, dark green above, pubescent, green and nearly or quite glabrous beneath; panicle elongated, very narrow and dense; hypanthium sparingly villous-pubescent; sepals soon reflexed, about 1 mm. long; petals rose-colored, suborbicular, 1.5 mm. long; follicles glabrous and shining, about 2 mm. long.

Low ground and along streams, Humid Transition and Canadian Zones; Alaska to Oregon and Idaho. Type locality: northwest coast of America. June–Aug.

4. *Spiraea Douglasii* Hook. Douglas' Spiraea. Fig. 2368.

Spiraea Douglasii Hook. Fl. Bor. Amer. 1: 172. 1832.

A shrub, 1–25 m. high with erect branches. Leaves short-petioled, elliptical to oval or oblong-cuneate, 3–10 cm. long, usually acute at both ends, serrate above the middle, dark green above, white-tomentose beneath; panicle narrow, elongated and congested; hypanthium tomentose; sepals reflexed; petals rose-colored, about 1.5 mm. long; follicles about 3 mm. long, glabrous and shining.

Low ground and along streams, Humid Transition and Boreal Zones; British Columbia to northern California. Type locality: northwest coast, about the Columbia. June–Sept.

Spiraea subvillösa Rydb. N. Amer. Fl. 22: 251. 1908. Perhaps a hybrid between *S. Douglasii* and *S. densiflora*. It differs from the other species having flat-topped panicles and pink flowers by the reflexed sepals. The type is from the Oregon side of the Cascades of the Columbia; it also has been found near Hood River.

Spiraea pyramidata Greene, Pittonia 2: 221. 1892. Perhaps a hybrid between *S. lucida* and *S. Menziesii*; it is distinguished from the former by the reflexed sepals and from the latter by the white flowers and ovoid instead of elongated panicle. Along streams and in wet places, Transition Zone; British Columbia to Idaho and Oregon. Type locality: Yakima River, near Cleatum, Washington.

Spiraea tomentulösa Rydb. N. Amer. Fl. 22: 251. 1908. Leaves tomentose beneath; panicle short, obovoid; sepals reflexed; petals white. Perhaps a hybrid between *S. lucida* and *S. Douglasii*. Originally collected in Falcon Valley, Washington.

4. PETROPHYTUM Rydb. Mem. N.Y. Bot. Gard. 1: 206. 1900.

Cespitose woody plants with prostrate branches, growing on rocks. Leaves persistent, crowded, oblanceolate or spatulate, entire. Flowers racemose, perfect. Sepals 5, valvate. Petals 5, imbricate, white; stamens about 20. Pistils 3–5; ovary densely pubescent; style filiform. Follicles dehiscent along both sutures. [Greek, meaning rock and plant.]

About 4 or 5 species, natives of western North America. Type species: *Spiraea caespitosa* Nutt.

Leaves 3-nerved.

Sepals obtuse; leaves glabrate.

Sepals acute; leaves canescent.

Leaves 1-nerved; canescent.

1. *P. Hendersonii*.

2. *P. cinerascens*.

3. *P. caespitosum*.

1. *Petrophytum Hendersonii* (Canby) Rydb. Henderson's Rock-spiraea.

Fig. 2369.

Eriogynia Hendersonii Canby, Bot. Gaz. 16: 236. 1891.

Luetkea Hendersonii Greene, Pittonia 2: 219. 1892.

Spiraea Hendersonii Piper, Erythra 7: 172. 1899.

Petrophytum Hendersonii Rydb. N. Amer. Fl. 22: 253. 1908.

Densely cespitose with short stout branches. Leaves spatulate, 1–2 cm. long, thick, more

or less 3-nerved beneath, sparingly appressed-pubescent or glabrate; peduncles 4–8 cm. long with few bract-like linear leaves; racemes narrow, 2.5–5 cm. long, densely flowered; sepals oblong, obtuse; petals 2.5 mm. long, obovate or oval.

Rocky cliffs, Boreal Zones; Olympic Mountains, Washington. Type locality: vertical cliffs near the summit of the Olympic Mountains. June–Sept.

2. *Petrophytum cinerascens* (Piper) Rydb. Gray Rock-spiraea. Fig. 2370.

Spiraea cinerascens Piper, Erythea 7: 171. 1899.

Luetkea cinerascens Heller, Muhlenbergia 1: 53. 1904.

Petrophytum cinerascens Rydb. N. Amer. Fl. 22: 253. 1908.

Densely caespitose undershrub with short, stout branches. Leaves oblanceolate, 1–2.5 cm. long, 3-nerved, somewhat cinereous with a short appressed rather sparse pubescence; peduncle cinereous, 5–15 cm. long; raceme often with a few branches below; sepals lanceolate, acuminate, about 2 mm. long, short-pubescent and glandular; petals narrowly oblong, scarcely 2 mm. long and but little exceeding the sepals.

Bluffs, along the Columbia River, Chelan County, Washington. Type locality: rocky bluffs along the Columbia River, about twelve miles south of Chelan. June–Sept.

3. *Petrophytum caespitosum* (Nutt.) Rydb. Cespitose Rock-spiraea. Fig. 2371.

Spiraea caespitosa Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 418. 1840.

Eriogynia caespitosa S. Wats. Bot. Gaz. 15: 242. 1890.

Luetkea caespitosa Kuntze, Rev. Gen. Pl. 217. 1891.

Petrophytum caespitosum Rydb. Mem. N.Y. Bot. Gard. 1: 206. 1900.

Densely caespitose, forming low depressed mats. Leaves spatulate, 5–12 mm. long, 1-nerved, densely silky-pubescent; peduncles 3–10 cm. long, silky, with small bract-like subulate leaves; raceme narrow, 1–4 cm. long, usually simple; sepals ovate-lanceolate, acute; petals spatulate or oblanceolate, 1.5 mm. long.

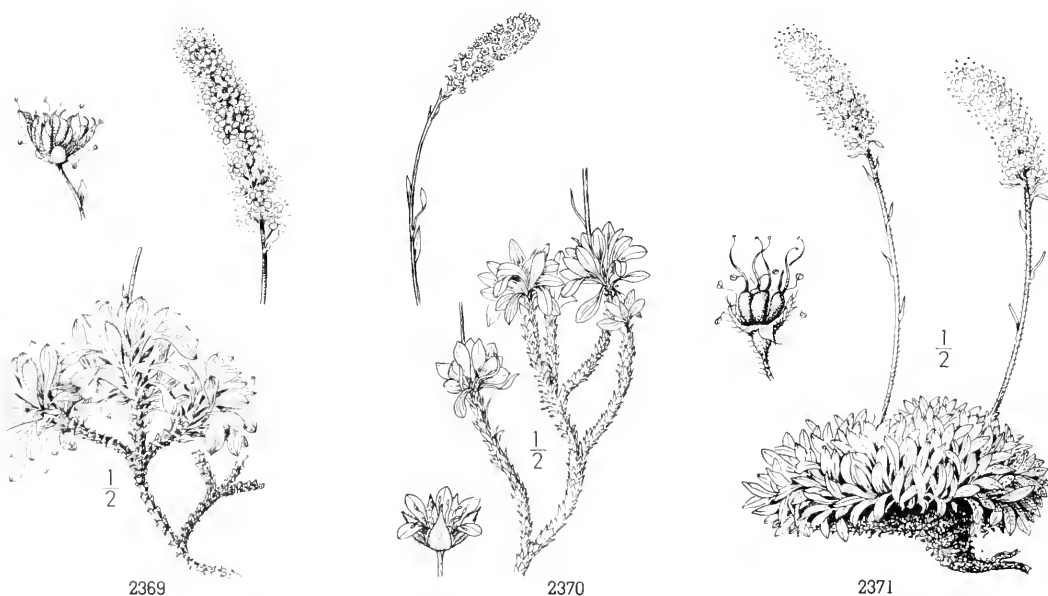
On rock ledges, Boreal Zones; Montana and Black Hills, South Dakota, to California, Arizona, and New Mexico. In California it occurs in the southern Sierra Nevada, Panamint, and Providence Mountains. Type locality: on high shelving rocks, in the Rocky Mountains, towards the sources of the Platte. June–Sept.

Petrophytum acuminatum Rydb. N. Amer. Fl. 22: 253. 1908. Closely related to *P. caespitosum* and possibly only a form of it. Distinguished by the sparingly pilose leaves and peduncles, the lanceolate acuminate sepals, and the oblanceolate, acute or acuminate petals. Known only from the type collection at Big Arroyo, Tulare County, California.

5. *LUÉTKEA* Bong. Mém. Acad. St.-Pétersb. VI. 2: 130. 1832.

Cespitose woody plants, with prostrate or decumbent stoloniferous branches. Leaves twice or thrice ternately dissected. Flowers racemose, perfect. Hypanthium hemispheric; sepals and petals 5; stamens about 20, their filaments subulate. Pistils usually 5, distinct; ovules several, pendulous. Follicles coriaceous, dehiscent on both sutures. [Name in honor of Count F. P. Luetke, 1797–1882, commander of a Russian exploring expedition in the Arctic.]

A monotypic genus of northwestern North America.



2369. *Petrophytum Hendersonii*

2370. *Petrophytum cinerascens*

2371. *Petrophytum caespitosum*

1. *Luetkea pectinàta* (Pursh) Kuntze. *Luetkea*. Fig. 2372.

Saxifraga pectinata Pursh, Fl. Amer. Sept. 312. 1814.

Luetkea sibbaldioides Bong. Mém. Acad. St. Pétersb. VI. 2: 130. 1832.

Eriogynia pectinata Hook. Fl. Bor. Amer. 1: 255. 1832.

Spiraea pectinata Torr. & Gray, Fl. N. Amer. 1: 417. 1840.

Saxifraga caespitosa A. Gray, Proc. Amer. Acad. 8: 383. 1870.

Luetkea pectinata Kuntze, Rev. Gen. Pl. 217. 1891.

Flowering shoots 5–15 cm. high, leafy, glabrous or sparsely pilose. Leaves dissected into linear acute divisions, grooved above, 1–1.5 cm. long, glabrate; raceme narrow, 1–5 cm. long; bracts ternate or the upper entire; sepals ovate, acute, 2 mm. long; petals white, round-ovate, 3–3.5 mm. long; stamens and styles included; follicles about 4 mm. long.

On moist rocky or sandy slopes, often forming mats. Canadian and Hudsonian Zones; Bering Straits south to Mount Shasta, California, and east to the Canadian Rockies. Type locality: "on the northwest coast," Menzies. July–Sept.

6. *ARÚNCUS* (L.) Adans. Fam. Pl. 2: 295. 1763.

Tall perennial herbs with thick rootstocks, 2–3-pinnate leaves without stipules. Flowers dioecious, in large open panicles composed of many slender spike-like branches. Sepals and petals 5, the pistillate much smaller than the staminate. Stamens 15–30, long-exserted. Pistils 3–5, distinct; styles short; ovules several, pendulous. Follicles reflexed in fruit, dehiscent along the ventral suture and dorsally at the apex; endosperm present. [Greek, meaning goat's beard.]

Two species, the typical species widely spread in the north temperate zone (sometimes separated into two or three species), the second, in Japan. Type species, *Spiraea Aruncus* L.

1. *Aruncus vulgàris* Raf. Goat's-beard. Fig. 2373.

Spiraea Aruncus L. Sp. Pl. 490. 1753.

Aruncus vulgàris Raf. Sylva Tell. 152. 1838.

Aruncus sylvestris Kostel. Ind. Hort. Prag. 15. 1844.

Aruncus acuminatus Rydb. N. Amer. Fl. 22: 255. 1908.

Stems erect, 1–2 m. high, glabrous. Leaflets ovate-lanceolate, acuminate, sharply and doubly serrate, 3–12 cm. long, more or less hairy on both surfaces; panicles terminal and axillary, 10–40 cm. long, the spike-like branches 3–15 cm. long; petals about 1 mm. long; follicles 3 mm. long.

Moist woods, Humid Transition and Canadian Zones; widely spread over Europe, Asia, and North America. Several forms have been considered as species. The one in western North America has been named *A. acuminatus* (Dougl.) Rydb. (N. Amer. Fl. 22: 255. 1908.) It ranges from Alaska to Mendocino County, California. May–July.

7. *CHAMAEBATIÀRIA* (Porter) Maxim. Act. Hort. Petrop. 6: 225. 1879.

Low resinous-glandular aromatic shrubs with bipinnate leaves, paniculate flowers. Hypanthium turbinate. Sepals 5. Petals 5. Stamens about 60. Pistils 5, more or less united below; ovules about 8, pendulous. Follicles coriaceous, dehiscent at apex and down ventral suture. Seeds terete; endosperm present. [Greek, meaning resembling *Chamaebatia*.]

A monotypic genus of western United States.



2372. *Luetkea pectinata*



2373. *Aruncus vulgàris*



2374. *Chamaebatiaria millefolium*

1. *Chamaebatiaria millefolium* (Torr.) Maxim. Desert-sweet. Fig. 2374.

Spiraea millefolium Torr. Pacif. R. Rep. 4: 83. 1857.

Chamaebatiaria millefolium Maxim. Act. Hort. Petrop. 6: 225. 1879.

Sorbaria millefolium Rocke in Engler & Prantl, Nat. Pflanzenf. 3^o: 16. 1888.

Basilima millefolium Greene, Fl. Fran. 57. 1891.

Shrub, 1–2 m. high, with the twigs, leaves and inflorescence stellate-pubescent and more or less glandular. Leaves 2–5 cm. long, oblong in outline, primary divisions 15–20 pairs, 4–8 mm. long, the secondary division 10–17 pairs, less than 1 mm. long; panicles terminal, leafy, 3–10 cm. long; sepals lanceolate, acute, 3–5 mm. long; petals white, broadly obovate, about 5 mm. long; follicles 5 mm. long, lanceolate.

Dry rocky ridges. Arid Transition Zone; southern Idaho to Arizona and the eastern slopes of the southern Sierra Nevada, California. Type locality: low hills and valleys near Williams, Arizona. June–Aug.

8. *HOLODISCUS* Maxim. Act. Hort. Petrop. 6: 253. 1879.

Shrubs, with alternate simple leaves and no stipules. Inflorescence racemose or paniculate. Hypanthium saucer-shaped or hemispheric. Sepals 5, 3-nerved, erect in fruit. Petals 5, white or pink. Stamens about 20, borne on the disk lining the hypanthium. Pistils 5, alternate with the sepals, pubescent; styles terminal; ovules 2, pendulous. Achenes enclosed in the hypanthium and sepals, hairy, indehiscent, caducous, strongly arched on the lower suture. [Name Greek, meaning entire disk.]

A genus of 6 or 7 species, native of western North America, Mexico, Central America, and Colombia. Type species, *Holodiscus discolor* (Pursh) Maxim.

Leaves 4–10 cm. long, mostly doubly toothed, the blades little or not at all decurrent on the petioles; panicle ample, twice or thrice compound. 1. *H. discolor*.

Leaves 0.8–2 cm. long, mostly simple-toothed, distinctly decurrent on the petiole; flowers in a simple raceme or with a few lateral branches below.

Young twigs and leaves not glandular-tomentose, more or less silky-villous or tomentose.

2. *H. dumosus saxicola*.

Young twigs and leaves glandular-tomentose, otherwise glabrous or sparingly short-villous.

3. *H. glabrescens*.

1. *Holodiscus discolor* (Pursh) Maxim. Ocean Spray. Fig. 2375.

Spiraea discolor Pursh, Fl. Amer. Sept. 342. 1814.

Spiraea ariacfolia Smith in Rees, Cycl. 33: No. 6. 1816.

Schizonotus discolor Raf. New Fl. 3: 75. 1838.

Holodiscus discolor Maxim. Act. Hort. Petrop. 6: 254. 1879.

Shrub 1–4 m. high, with brown or purplish exfoliating bark, young twigs more or less villous and tomentose. Leaves broadly ovate or oval, 4–10 cm. long, usually double-toothed, acute at apex, truncate to cuneate at base, but scarcely or not at all decurrent on the petiole, glabrate above, more or less densely villous and tomentose beneath; inflorescence twice or thrice compound, 10–20 cm. long; sepals oblong to oblong-lanceolate, acutish, 1.5 mm. long; petals elliptic, 1.5 mm. long.

Hillsides and river bottoms, mainly Humid Transition Zone; British Columbia, northern Idaho, and western Montana to northern California. Type locality: banks of the Kooskoosky. June–Aug.

Holodiscus discolor var. *franciscanus* (Rydb.) Jepson, Fl. Calif. 2: 166. 1936. Shrub 1.5–7 m. high, closely resembling the typical species but leaves thicker, densely short-pubescent above, rounded or truncate at base; sepals ovate, acute. Coastal region of Oregon and California from Columbia River to Orange County, California.

2. *Holodiscus dumosus* subsp. *saxicola* (Heller) Abrams. Bush Rock-spiraea. Fig. 2376.

Holodiscus saxicola Heller, Muhlenbergia 1: 41. 1904.

Sericotheca saxicola Rydb. N. Amer. Fl. 22: 263. 1908.

Spiraea discolor var. *dumosa* S. Wats. Bot. Calif. 1: 170, in part. 1876. Not *S. dumosa* Nutt.

Low shrub 3–10 dm. high, branched from the base, young twigs villous. Leaves broadly oval to orbicular, 8–15 mm. long, rounded at apex, abruptly narrowed at base into the short winged petiole, simply crenate-serrate, bright green and sparingly pubescent above, tomentose beneath and sparsely villous; raceme simple or with a few branches below, 3–10 cm. long, villous; sepals ovate-lanceolate; petals broadly ovate, 2 mm. long.

Granitic rock, Boreal Zones; Sierra Nevada, California. Type locality: Donner Pass, Nevada County, California. July–Sept.

3. *Holodiscus glabrescens* (Greenm.) Heller. Glandular Rock-spiraea. Fig. 2377.

Spiraea discolor var. *glabrescens* Greenm. Erythra 7: 116. 1899.

Holodiscus glabrescens Heller, Muhlenbergia 1: 40. 1904.

Sericotheca glabrescens Rydb. N. Amer. Fl. 22: 265. 1908.

Sericotheca obovata Rydb. N. Amer. Fl. 22: 264. 1908.

Holodiscus discolor var. *glabrescens* Jepson, Man. Fl. Pl. Calif. 479. 1925.

Low diffusely branched shrub, 5–15 dm. high, young twigs sparingly villous or glabrous,

conspicuously glandular-atomiferous. Leaves cuneate-obovate, 10–15 mm. long, decurrent on the petioles, simply and evenly toothed above the middle, glandular-atomiferous on both surfaces, glabrous or short-villous on the veins; raceme simple or more or less compound.

Rocky mountain ridges, Boreal Zones; southeastern Oregon to the northern Sierra Nevada, California, east to Utah. Type locality: Steens Mountain, Oregon. July–Aug.

9. FILIPÉNDULA [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Perennial herbs with rootstocks, pinnate leaves, and large stipules. Flowers in large paniculate often corymbose cymes. Hypanthium flat. Sepals and petals 5. Stamens 20–40. Pistil 5–15, distinct, stigma large, capitate. Carpels indehiscent, coriaceous, 1-seeded. [Latin, meaning a hanging thread.]

About 10 species, natives of the north temperate zone. Besides the following *Filipendula rubra* (Hill) Robinson occurs in eastern North America. Several Old World species are cultivated. Type species: *Spiraea Filipendula* L.

1. *Filipendula occidentalis* (S. Wats.) Howell. Western Meadow-Queen.

Fig. 2378.

Spiraea occidentalis S. Wats. Proc. Amer. Acad. 18: 192. 1883.

Filipendula occidentalis Howell, Fl. N.W. Amer. 1: 185. 1898.

Stems 1–2 m. high, simple, straw-colored, pubescent above. Leaves pinnate with a large terminal division and small lateral ones, pubescent on both surfaces especially on the veins, terminal leaflet 8–15 cm. broad, digitately 3–7-cleft with doubly serrate lobes; the lateral leaflets



2375. *Holodiscus discolor*
2376. *Holodiscus dumosus*

2377. *Holodiscus glabrescens*
2378. *Filipendula occidentalis*

2379. *Horkelia frondosa*
2380. *Horkelia elata*

of 1 or 2 pairs, ovate to lanceolate, toothed, 5-10 mm. long; inflorescence flat-topped; petals white, 5-6 mm. long; achenes long-stipitate.

Along streams, Humid Transition Zone; Coast Ranges of Oregon. Type locality: Trask River, Tillamook County. June-Aug.

10. *HORKELIA Cham. & Sch. Linnaea 2: 26. 1827.

Perennial herbs with a thick woody caudex or rootstock covered with brown scales, pinnate leaves, and cymose flowers. Hypanthium deeply campanulate to saucer-shaped; bractlets 5, alternating with the 5 sepals. Petals variable, unguiculate, white or rarely cream-colored. Stamens 10 or rarely 20, inserted in the throat of the hypanthium and remote from the base of the receptacle; filaments dilated. Receptacle hemispherical or conical with several to numerous pistils. Styles long and slender, generally thickened and somewhat glandular at base, deciduous. Ovules and seeds pendulous, anatropous. [Name in honor of John Horkel, a German physiologist.]

About 30 species, natives of western North America, chiefly California. Type species, *Horkelia californica* Cham. & Sch.

Stamens 10; sepals erect or spreading.

Bractlets ovate, simulating the sepals; pistils 50 or more.

Hypanthium cylindric-cupulate, 3-5 mm. deep; bractlets equaling or exceeding the sepals, often toothed.

Hypanthium glabrous within; sepals green on inner surface.

Leaflets 3-5 pairs, serrate; filaments opposite the sepals, lanceolate-deltoid.

Leaflets 5-10 pairs, deeply incised; filaments all essentially linear.

Hypanthium pubescent within; sepals purple-flecked within.

Hypanthium deeply saucer-shaped, 1.5-2 mm. deep; bractlets shorter than the sepals.

Leaflets 5-10 pairs, the uppermost confluent.

Leaflets 1-3 pairs, the terminal one petiolulate.

Bractlets lanceolate to linear, much smaller than the sepals.

Pedicels recurved in fruit; cyme diffuse; hypanthium glabrous within.

Hypanthium saucer-shaped, 5-6 mm. broad; pistils 17-30, rarely 50.

Hypanthium cupulate, 3-4 mm. broad; pistils 3-4.

Pedicels erect, never recurved.

Leaflets 5-20 pairs, the margin serrate to incised.

Stipules of basal leaves not dissected; style glandular at base.

Filaments glabrous.

Hypanthium glabrous within.

Petals cuneate, truncate or emarginate at apex; leaflets serrate to incised.

Petals oblanceolate, rounded at apex; leaflets toothed at apex or palmately lobed.

Hypanthium pubescent within.

Leaflets serrate or shallowly lobed.

Herbage appressed-villous and more or less hoary; montane species.

Herbage shaggy-villous; maritime species.

Leaflets deeply palmatifid.

Cymes compact, many-flowered; leaflets villous, 5-10 mm. long.

Cymes open, few-flowered; leaflets short-hirsute, 3.5-5 mm. long.

Filaments pubescent; herbage densely silky-villous.

Stipules of basal leaves 2-4 times divided into filiform segments; style not glandular at base.

Cyme diffuse; leaflets simply cleft or dissected; hypanthium turbinate.

Cyme compact; leaflets compoundly dissected; hypanthium shallowly cupulate.

Leaflets 2-5 pairs, entire or short-toothed only at apex.

Petals emarginate or rarely rounded, well exceeding the sepals, and as broad or broader than long, cream-colored.

Petals obtuse or rounded at apex, equaling or shorter than sepals and narrower than long, white.

Stamens 20; sepals reflexed in anthesis.

1. *Horkelia frondosa* (Greene) Rydb. Leafy Horkelia. Fig. 2379.

Potentilla frondosa Greene, Pittonia 1: 300. 1889.

Horkelia frondosa Rydb. Bull. Torrey Club 25: 54. 1898.

Potentilla californica var. *frondosa* Jepson, Man. Fl. Calif. 494. 1925.

Stems leafy throughout, stout, erect or decumbent, 0.5-1 m. high, glandular-pubescent and fragrant. Lower leaves with 7-9, the upper with 3-7 leaflets, glandular-villous; leaflets 3-5 cm. long, ovate to oblong, doubly serrate, with mostly rounded teeth; bractlets ovate, 3-5 mm. long, usually 3-toothed, slightly exceeding the triangular-lanceolate sepals; petals oblong, shorter than the sepals.

Open slopes near the coast, Upper Sonoran and Transition Zones; San Francisco Bay region to Monterey, California. Type locality: Martinez, Contra Costa County. May-Oct.

* The keys and specific and subspecific limits in the genera *Horkelia* and *Ivesia* are based largely on David D. Keck's able revision recently published.

2. *Horkelia elata* (Greene) Rydb. Tall *Horkelia*. Fig. 2380.

Potentilla elata Greene, Pittonia 1: 100. 1887.

Potentilla californica var. *elata* Greene, Fl. Fran. 1: 66. 1891.

Horkelia elata Rydb. Bull. Torrey Club 25: 54. 1898.

Stems slender and numerous, 5–8 dm. high, softly glandular-villous. Basal leaves numerous, slender-petioled; leaflets obovate or cuneate-flabelliform, cleft and incised into very narrow segments, soft-villous; stem leaves few and smaller; hypanthium campanulate, glandular-villous; bractlets lanceolate, usually entire, 4–6 mm. long, slightly exceeding the triangular-lanceolate sepals; petals about equaling the sepals.

Shady slopes, Upper Sonoran and Transition Zones; Inner Coast Ranges and western slopes of the Sierra Nevada, central California. Type locality: shady banks of the upper Napa River, a little above Calistoga. June–Sept.

Horkelia glandulosa Eastw. Bull. Torrey Club 32: 195. 1905. A more robust plant than typical *H. elata* Greene, and with fewer leaflets, usually about 11 pairs, but otherwise closely resembling it and perhaps not distinct. Known only from the type locality and vicinity: Laytonville, Mendocino County, California.

3. *Horkelia californica* Cham. & Sch. California *Horkelia*. Fig. 2381.

Horkelia californica Cham. & Sch. Linnaea 2: 26. 1827.

Horkelia grandis Hook. & Arn. Bot. Beechey 339. 1838.

Potentilla californica Greene, Pittonia 1: 100. 1887.

Potentilla californica var. *carmeliana* Jepson, Fl. W. Mid. Calif. 282. 1901.

Stems stout, leafy, 0.5–1 m. high, glandular-pubescent and fragrant. Leaves densely glandular-pubescent, the basal numerous bearing 11–21 leaflets, the cauline smoother; leaflets obovate to orbicular in outline, 2–5 cm. long, toothed and incised, with mostly acute teeth; inflorescence open; bractlets 5–10 mm. long, slightly exceeding the sepals, ovate, usually 3-toothed; sepals ovate, acute, much longer than the strap-shaped petals.

Open places, near the coast, Upper Sonoran and Transition Zones; Humboldt Bay to Santa Cruz County and locally in San Luis Obispo County, California. Type locality: San Francisco. May–Sept.

4. *Horkelia cuneata* Lindl. Wedge-leaved *Horkelia*. Fig. 2382.

Horkelia cuneata Lindl. Bot. Reg. 23: under *pl.* 1997. 1837.

Horkelia californica var. *cuneata* A. Gray, Proc. Amer. Acad. 6: 529. 1865.

Potentilla Lindleyi Greene, Pittonia 1: 101. 1887.

Horkelia platycalyx Rydb. Mem. Dept. Bot. Columbia Univ. 2: 131. 1898.

Potentilla multijuga of various California authors. Not Lehm.

Stems several, from a short woody caudex, rather slender, 15–30 cm. high, villous and glandular or nearly glabrous, fragrant. Leaflets of basal leaves 8–12 pairs, cuneate to obovate, about 1 cm. long, deeply toothed above, villous or hirsute-puberulent; cyme few-flowered, rather dense; hypanthium villous-glandular, cupulate, 5–8 mm. broad, densely pilose within; bractlets ovate-lanceolate; sepals slightly exceeding the bractlets, acuminate; petals oblong-spatulate, about one-third longer than the sepals.

Open fields near the coast, Upper Sonoran and Humid Transition Zones; Santa Cruz County to Santa Barbara County, California. Type locality: California, probably Monterey. May–Oct.

Horkelia cuneata subsp. *sericea* (A. Gray) Keck, Lloydia 1: 86. 1938. (*Horkelia californica* var. *sericea* A. Gray, Proc. Amer. Acad. 6: 529. 1865; *H. Kelloggii* Greene, Bull. Calif. Acad. 2: 416. 1887.) Herbage densely silky-sericeous, only obscurely glandular, hypanthium as in the typical species densely pilose within and the flowers usually in glomerules. Along the coast from Sonoma County to Los Angeles County, California.

Horkelia cuneata subsp. *puberula* (Greene) Keck, op. cit. 87. (*Potentilla puberula* Greene, Pittonia 1: 102. 1887; *P. Lindleyi* var. *puberula* Jepson, Man. Fl. Pl. Calif. 485. 1925.) Herbage rather thinly glandular-pubescent; flowers in open cymes, not glomerate; hypanthium sparsely pilose to glabrate within. Inland mesas and hills of southern California from San Luis Obispo County to San Bernardino and San Diego Counties. Type locality: mesas five miles west of San Bernardino, California.

5. *Horkelia truncata* Rydb. Ramona *Horkelia*. Fig. 2383.

Horkelia truncata Rydb. N. Amer. Fl. 22: 274. 1908.

Potentilla truncata Jepson, Man. Fl. Pl. Calif. 495. 1925.

Stems several from a woody caudex, 2–5 dm. high, rather thinly glandular-pubescent. Basal leaves several, glandular-pubescent and hirsute on the veins; leaflets 5–9, obovate-cuneate, truncate at the apex, crenate-serrate on the sides, usually with 3 larger teeth at the apex; inflorescence few-flowered and open; hypanthium saucer-shaped, 7–8 mm. wide; bractlets lanceolate-ovate, 4–5 mm. long, shorter than the ovate, acuminate sepals; petals broadly obovate, 5–6 mm. long.

Hillsides, Upper Sonoran Zone; western San Diego County, California, and adjacent Lower California. Type locality: Ramona, California. May–June.

6. *Horkelia Parryi* Greene. Parry's *Horkelia*. Fig. 2384.

Potentilla Parryi Greene, Pittonia 1: 102. 1887.

Horkelia platypetala Rydb. Bull. Torrey Club 25: 55. 1898.

Stems several, 1–2 dm. high, from a much branched caespitose caudex, glandular-puberulent; stipules ovate, often pectinately toothed. Leaflets of basal leaves 4–5 pairs, obovate-cuneate, 5–10 mm. long, deeply incised, somewhat villous-pubescent but green; cyme with slender branches; pedicels very slender, 10–15 mm. long, recurved in fruit; hypanthium 6–7 mm. broad in fruit; sepals ovate-lanceolate, 5 mm. long, much larger than the lanceolate bractlets; petals obovate-oblong, exceeding the sepals, rounded at the apex.

Stony places, Upper Sonoran and Arid Transition Zones; foothills of the Sierra Nevada from Eldorado County to Calaveras County, California. Type locality: vicinity of Ione, Amador County, California. April–July.

7. *Horkelia Wilderae* Parish. Wilder's *Horkelia*. Fig. 2385.

Horkelia Wilderae Parish, Bot. Gaz. 38: 460. 1904.

Potentilla Wilderae Munz & Jtn. Bull. S. Calif. Acad. 24: 8. 1925.

Potentilla Parryi var. *Wilderae* Jepson, Man. Fl. Pl. Calif. 494. 1925.

Stems several crowning a deep perpendicular taproot, slender, 2 dm. high; stipules lanceolate, entire or 1-2-toothed. Leaflets of basal leaves 5-6 pairs, 5-7 cm. long, cuneate, deeply incised, the lobes oblong; cyme diffuse, the flowers numerous on very slender recurved pedicels; hypanthium glabrate, about 2 mm. broad; sepals lanceolate, 2 mm. long, twice the length of the linear-oblong bractlets; petals obovate, about equaling the sepals.

Along trail leading from Barton Flat to South Fork of Santa Ana River, San Bernardino Mountains, California. The only known locality. June-Aug.

8. *Horkelia fúscá* Lindl. Dusky *Horkelia*. Fig. 2386.

Horkelia fusca Lindl. Bot. Reg. 23: pl. 1997. 1837.

Potentilla Douglasii Greene, Pittonia 1: 103. 1887.

Horkelia tenuisecta Rydb. N. Amer. Fl. 22: 278. 1908.

Stems from a short woody caudex, 1-3 dm. high, erect and simple, densely glandular above. Leaflets of basal leaves 5-10 pairs, 5-10 mm. long, cuneate or obovate in outline, deeply pinnatifid into linear segments, these sometimes again toothed; cymes corymbose and congested or open; hypanthium 4 mm. broad, glandular-hirsute; sepals acuminate, 4 mm. long; petals cuneate, slightly emarginate, 4 mm. long.

Meadows and open woods, mainly Transition Zone; Kittitas County, Washington, to the vicinity of Mount Hood, Oregon. Type locality: erroneously attributed to "California." May-Aug.

Horkelia fusca subsp. *capitata* (Lindl.) Keck, Lloydia 1: 97. 1938. (*Horkelia capitata* Lindl. Bot. Reg. 23: under pl. 1997. 1837; *Potentilla capitata* Greene, Pittonia 1: 104. 1887; *Horkelia caeruleomontana* St. John, Fl. S.E. Wash. 199. 1937.) Stems stout, 4-6 dm. high, glandular-hirsute above. Leaflets of basal leaves 5-7 pairs, obovate or oval, 2-3 cm. long, bright green and nearly glabrous, deeply incised-toothed; cymes subcapitate, purple, subtended by broad palmately divided leaves, equaling or surpassing the head; sepals acuminate, 4-5 mm. long, about equaled by the linear bractlets; petals 5-6 mm. long, truncate. Open coniferous forests, Arid Transition and Canadian Zones; Coeur d'Alene Mountains, Idaho, to the Blue and Steens Mountains, eastern Oregon, and Warner Mountains, California. Type locality: "America-boreali-occidentalis," Douglas.

Horkelia fusca subsp. *pseudocapitata* (Rydb.) Keck, Lloydia 1: 99. 1938. (*Horkelia pseudocapitata* Rydb. ex Howell, Fl. N.W. Amer. 1: 180. 1898; *H. Brownii* Rydb. N. Amer. Fl. 22: 276. 1908; *Potentilla Douglasii* var. *pseudocapitata* Jepson, Fl. Calif. 2: 203. 1936.) Leaflets of basal leaves 5-7 pairs, obovate or cuneate, 8-20 cm. long, toothed or incised above; cymes subcapitate, their leaves small, much shorter than the heads; sepals ovate-lanceolate, well exceeding the linear bractlets; petals broadly cuneate, 3-4 mm. long, truncate or slightly emarginate at apex. Border of mountain meadows, Arid Transition and Canadian Zones; Deschutes County, Oregon, to the eastern slopes of the northern Sierra Nevada, California, and adjacent Nevada. Type locality: Jonesville, Lassen County, California.

Horkelia fusca subsp. *parviflora* (Nutt.) Keck, Lloydia 1: 99. 1938. (*Horkelia parviflora* Nutt. ex Hook. & Arn. Bot. Beechey 338. 1838; *Potentilla Andersonii* Greene, Pittonia 1: 104. 1887.) Leaves sparingly pubescent, dark green, decidedly glandular; leaflets 4-8 pairs, cuneate-obovate, cleft at the apex into oblong or lanceolate lobes; cyme capitate or branched; bractlets linear-filiform; sepals lanceolate, 2-3 mm. long; petals broadly cuneate, 2-3 mm. long. Open pine forests, Arid Transition and Canadian Zones; central Idaho and Yellowstone Park to southern Washington and along the Cascades and Sierra Nevada to Tulare County, California. Type locality: "Plains of the Oregon [Columbia] toward the Rocky Mountains."

Horkelia fusca subsp. *filicoides* (Crum) Keck, Lloydia 1: 100. 1938. (*Potentilla Douglasii* var. *filicoides* Crum, Leaflets W. Bot. 1: 100. 1934.) Leaves mostly basal; leaflets deeply pinnatifid into linear segments; cyme openly branched, the flowers solitary or in small glomerules; sepals much exceeding the bractlets. Open pine woods, Transition and Canadian Zones; Cascade Mountains, southern Oregon. Type locality: "eight miles north of Diamond Lake, Douglas County, Oregon."

Horkelia fusca subsp. *tenella* (S. Wats.) Keck, Lloydia 1: 101. 1938. (*Horkelia fusca* var. *tenella* S. Wats. Bot. Calif. 1: 181. 1876; *Horkelia tenella* Rydb. Bull. Torrey Club 25: 55. 1898.) Leaflets small, palmately divided into linear-oblong segments; cymes dense, usually capitate; otherwise as in subsp. *parviflora*. Dry meadows and flats of volcanic ash, mainly Arid Transition Zone; northern Sierra Nevada, Shasta and Tehama Counties to Sierra County, California. Type locality: "Sierra County," California.

9. *Horkelia Clevelandii* (Greene) Rydb. Cleveland's *Horkelia*. Fig. 2387.

Potentilla Clevelandii Greene, Pittonia 1: 102. 1887.

Horkelia Clevelandii Rydb. Bull. Torrey Club 25: 54. 1898.

Horkelia Bolanderi subsp. *Clevelandii* Keck, Lloydia 1: 94. 1938.

Stems several from a short caudex, simple, 2-4 dm. high, finely pubescent with spreading hairs, glandular above. Leaflets of basal leaves 7-11 pairs, densely silky-pubescent, broadly obovate-cuneate, 5-10 mm. long and often as broad, deeply crenate-toothed at the apex; cyme with short erect branches; hypanthium finely pubescent, somewhat glandular; sepals ovate-lanceolate, acute, 4 mm. long, a little longer than the ovate bractlets; petals spatulate-oblong, a little longer than the sepals.

Grassy mountain slopes, Arid Transition Zone; San Jacinto and Cuyamaca Mountains, southern California. Type locality: Laguna, San Diego County, California. June-July.

10. *Horkelia Bolánderi* A. Gray. Bolander's *Horkelia*. Fig. 2388.

Horkelia Bolanderi A. Gray, Proc. Amer. Acad. 7: 338. 1868.

Potentilla Bolanderii Greene, Pittonia 1: 103. 1887.

Stems several from a slender much branched and somewhat tufted caudex, 1-3 dm. high, finely villous; stipules lanceolate, 5 mm. long, mostly entire. Leaflets of basal leaves 6-11 pairs, loosely to densely villous or hoary-canescens, about 5 mm. long, cuneate, coarsely 3-5-toothed at the apex; cyme subcapitate or often more open; hypanthium about 4 mm. broad, saucer-shaped, hoary-pubescent; bractlets linear-lanceolate, generally much shorter than the broadly

lanceolate sepals, these about 5 mm. long; petals oblong-spatulate, rounded at the apex, about a third longer than the sepals.

Dry grassy slopes of open pine forests, Upper Sonoran and Arid Transition Zones; Lake County to Monterey County, California, in the Inner Coast Ranges chiefly. Type locality: dry alkaline soil near Clear Lake, Lake County, California. June–Aug.

Horkelia Bolanderi subsp. *Párryi* (S. Wats.) Keck, *Lloydia* 1: 92. 1938. (*Horkelia Parryi* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 129. 1898, not Greene; *H. bernardina* Rydb. N. Amer. Fl. 22: 273. 1908; *H. Rydbergii* Elmer, Bot. Gaz. 39: 50. 1905.) Closely resembling the typical form, but leaves more broadly cuneate, and pubescence more appressed. Open pine forests; Santa Lucia Mountains, Mount Pinos and San Bernardino Mountains, California.

11. *Horkelia marinensis* (Elmer) Crum. Point Reyes *Horkelia*. Fig. 2389.

Horkelia Bolanderi var. *marinensis* Elmer, Bot. Gaz. 41: 321. 1906.

Potentilla Kelloggii var. *marinensis* Jepson, Fl. Calif. 2: 199. 1936.

Horkelia marinensis Crum ex Keck, *Lloydia* 1: 91. 1938.

Stems several, from a stout branching matted caudex, 12–20 cm. high, pilose-tomentose and glandular, fragrant. Basal leaves densely tufted, 4–6 cm. long, short-petioled; leaflets 7–10 pairs, densely shaggy-villous canescent, cuneate-obovate, palmately lobed into 3–7 segments; stem leaves few, much reduced; cymes compact and subcapitate; hypanthium coarsely pilose, 1.5 mm. deep; sepals 5–6 mm. long; petals about 5 mm. long; pistils about 25; filaments all dilated, often pink.

Seacoast, usually on or near dunes, Humid Transition Zone; Mendocino County to Marin County, California. Type locality: Point Reyes, Marin County, California. May–Aug.

12. *Horkelia tenuiloba* (Torr.) A. Gray. Santa Rosa *Horkelia*. Fig. 2390.

Horkelia fusca var. *tenuiloba* Torr. Pacif. R. Rep. 4: 84. 1857.

Horkelia tenuiloba A. Gray, Proc. Amer. Acad. 6: 529. 1865.

Potentilla tenuiloba Greene, Pittonia 1: 105. 1887.

Potentilla Micheneri Greene, Erythea 1: 5. 1893.

Potentilla stenoloba Greene, Erythea 3: 36. 1895.

Horkelia Micheneri Rydb. Bull. Torrey Club 25: 54. 1898.

Stems 1–2 dm. high, with a short woody caudex and a horizontal rootstock, hirsute-villous, mostly simple, stipules often pectinate-toothed. Leaflets of basal leaves 6–10 pairs, about 1 cm. long, divided almost to the base into linear segments, canescent-hirsute; cyme dense, often subcapitate; hypanthium 5 mm. broad, hirsute; bractlets linear-filiform; sepals broadly lanceolate, 4 mm. long; petals oblong, scarcely exceeding the sepals, notched at the apex.

Dry ridges, Upper Sonoran Zone; Sonoma County to San Luis Obispo County, California. Type locality: "Laguna of Santa Rosa Creek, California." April–July.

13. *Horkelia hispidula* Rydb. White Mountains *Horkelia*. Fig. 2391.

Horkelia hispidula Rydb. N. Amer. Fl. 22: 278. 1908.

Potentilla hispidula Jepson, Man. Fl. Pl. Calif. 493. 1925.

Stems slender from an erect caudex, 2 dm. high, sparingly hirsute and glandular-puberulent. Leaflets of basal leaves 7–12 pairs, rather crowded, cuneate-flabelliform, 4–6 mm. long, divided to near the base into 3–6 spatulate segments, densely short-hirsute; cyme with ascending branches, 3–4-flowered; hypanthium 4 mm. broad, sparingly pilose and glandular; sepals lanceolate, acuminate, 4 mm. long, exceeding the narrowly linear bractlets; petals obcordate, 5 mm. long.

A little known species originally collected under pines among rocks, White Mountains, California, at an altitude of 3,300 meters. June–Aug.

14. *Horkelia Hendersonii* Howell. Henderson's *Horkelia*. Fig. 2392.

Horkelia Hendersonii Howell, Pacif. Coast Pl. Coll. 1887: 2. 1887.

Stems simple, about 1 dm. high, from a thick cespitose caudex, hirsute-villous; stipules lanceolate, mostly entire. Basal leaves numerous, densely canescent-hirsute; leaflets rather crowded, 5–8 pairs, cuneate, about 5 mm. long, incised into 4–6 unequal oblong lobes; cymes dense; hypanthium cup-shaped, 4 mm. broad; sepals 4 mm. long, longer than the linear-filiform bractlets; petals oblong-linear, usually shorter than the sepals.

Mountain slopes, Canadian Zone; Mount Ashland, Siskiyou Mountains, southern Oregon. Type locality: "Summit of Ashland Butte," Oregon. June–Aug.

15. *Horkelia sericata* S. Wats. Howell's *Horkelia*. Fig. 2393.

Horkelia sericata S. Wats. Proc. Amer. Acad. 20: 364. 1885.

Potentilla Howellii Greene, Pittonia 1: 104. 1887.

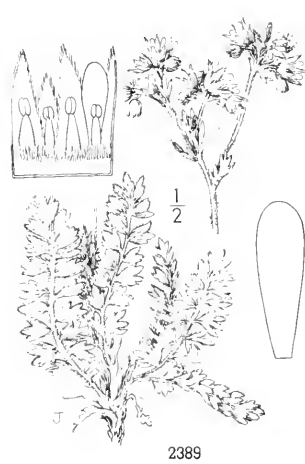
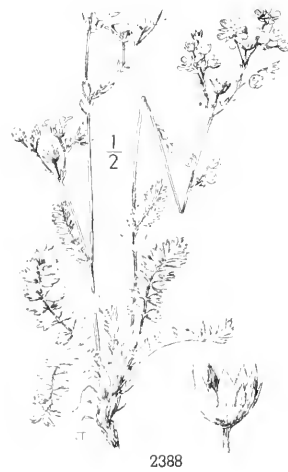
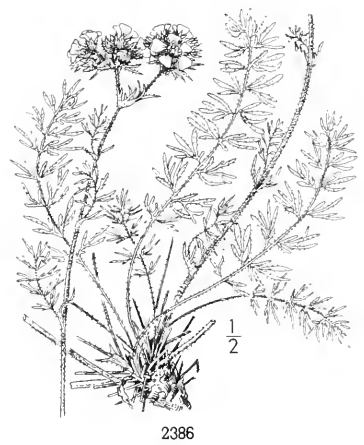
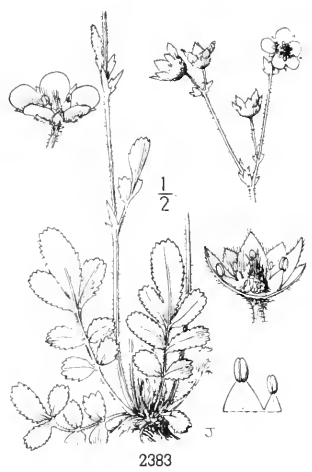
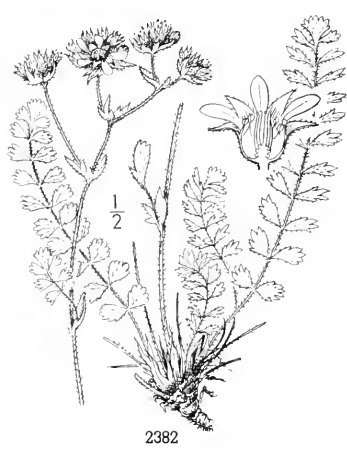
Potentilla sericata Greene, loc. cit.

Potentilla laxiflora Drew, Bull. Torrey Club 16: 151. 1889.

Horkelia laxiflora Rydb. Bull. Torrey Club 25: 55. 1898.

Horkelia Howellii Rydb. loc. cit.

Stems several from a short caudex, slender, simple, sparsely villous. Leaflets of basal leaves 5–20 pairs, very crowded, 3–10 mm. long, ovate-oblong, entire or usually cleft to the base into 2–3 similar segments, more or less villous; cyme few-flowered with elongate branches and very short pedicels; hypanthium silky-villous and glandular. 3–4 mm. broad; sepals lanceolate, 3 mm.



2381. *Horkelia californica*
2382. *Horkelia cuneata*
2383. *Horkelia truncata*

2384. *Horkelia Parryi*
2385. *Horkelia Wilderae*
2386. *Horkelia fusca*

2387. *Horkelia Clevelandii*
2388. *Horkelia Bolanderi*
2389. *Horkelia marinensis*

long, longer than the linear bractlets; petals obcordate, unguiculate, exceeding the sepals; pistils 3–6; styles glandless, long-persistent.

Barren slopes, Transition and Canadian Zones; Coast Ranges of southwestern Oregon. Type locality: summit of the Coast Range, Curry County, Oregon. May–Aug.

16. *Horkelia daucifolia* (Greene) Rydb. Carrot-leaved Horkelia. Fig. 2394.

Potentilla daucifolia Greene, Pittonia 1: 160. 1888.

Potentilla congesta var. *lobata* Lemmon, Bull. Torrey Club 16: 211. 1889.

Horkelia daucifolia Rydb. Bull. Torrey Club 25: 55. 1898.

Horkelia caruifolia Rydb. ex Howell, Fl. N.W. Amer. 1: 181. 1898.

Stems mostly simple from a short caudex, about 3 dm. high, glandular-pubescent throughout and pilose with long fine hairs. Leaflets of basal leaves 8–12 pairs, 1–3 cm. long, divided to near the base into linear segments, silky-pilose; stipules of basal leaves twice dissected into narrowly linear segments; hypanthium 4–5 mm. broad, silky-pilose; sepals 4–5 mm. long, triangular-lanceolate, a little longer than the linear bractlets.

Dry, barren ground, Arid Transition Zone; Rogue River Valley, Oregon, to Shasta Valley, California. Type locality: Klamath and Shasta Valleys, California. May–Aug.

17. *Horkelia congesta* Dougl. Dense-flowered Horkelia. Fig. 2395.

Horkelia congesta Dougl. ex Hook. Bot. Mag. 56: pl. 2880. 1829.

Horkelia hirsuta Lindl. Bot. Reg. 23: under pl. 1997. 1837.

Sibbaldia congesta D. Dietr. Syn. Pl. 2: 1020. 1840.

Potentilla congesta Baillon, Hist. Pl. 1: 369. 1867–9.

Stems slender from a short caudex, 3–4 dm. high, hirsute toward the base. Leaflets of basal leaves 4–5 pairs, linear-oblong, 10–15 mm. long, deeply 2–3-toothed at apex, silky-villous, pale green and thin; stipules filiform-divided; hypanthium sparingly silky-villous without, glabrous within, 5 mm. broad; sepals ovate-acuminate, 2–3 mm. long, exceeding the linear-filiform bractlets; petals broadly obovate, cream-colored, nearly 4 mm. long; filaments all lanceolate.

Dry open places, Transition Zones; Willamette Valley south to Josephine County, Oregon. Type locality: Umpqua River, Oregon. May–July.

18. *Horkelia tridentata* Torr. Three-toothed Horkelia. Fig. 2396.

Horkelia tridentata Torr. Pacif. R. Rep. 4: 84. 1857.

Horkelia Tilingii Regel, Act. Hort. Petrop. 1: 153. 1871.

Potentilla Tilingii Greene, Pittonia 1: 105. 1887.

Horkelia flavescens Rydb. Mem. Dept. Bot. Columbia Univ. 2: 138. 1898.

Horkelia integrifolia Rydb. N. Amer. Fl. 22: 279. 1908.

Potentilla congesta var. *Tilingii* Jepson, Man. Fl. Pl. Calif. 496. 1925.

Stems several, ascending or decumbent from a short cespitose caudex and taproot, 2–4 dm. high. Leaflets of basal leaves 3–4 pairs, cuneate to oblong-obovate, generally 3-toothed at the apex, 10–15 mm. long, white silky-pubescent; cyme often branched with subcapitate terminal clusters of flowers; hypanthium silky-villous, 3–4 mm. broad; sepals broadly ovate, 1–2 mm. long, exceeding the linear bractlets; petals oblanceolate; filaments all linear-lanceolate.

Open places in yellow pine forests, Arid Transition Zone; Siskiyou Mountains, southern Oregon to the Coast Ranges, northern Lake County, and to the southern Sierra Nevada, California. Type locality: "wet ravines, Duffield's Ranch, Sierra Nevada, Tuolumne County, California." May–July.

19. *Horkelia purpurascens* S. Wats. Purple Horkelia. Fig. 2397.

Horkelia purpurascens S. Wats. Proc. Amer. Acad. 11: 148. 1876.

Potentilla purpurascens Greene, Pittonia 1: 105. 1887.

Horkeliella purpurascens Rydb. N. Amer. Fl. 22: 282. 1908.

Potentilla purpurascens var. *pinetorum* Coville, Proc. Biol. Soc. Wash. 7: 77. 1892.

Ivesia purpurascens Keck, Lloydia 1: 132. 1938.

Stems erect from a short erect caudex, more or less pubescent and glandular. Basal leaves numerous, 8–15 cm. long; leaflets 15–20 pairs, crowded, 2–4 mm. long, divided to near the base into 2–4 oval lobes, more or less hirsute; cyme narrow with erect branches; hypanthium hirsute, cupulate, 4–5 mm. broad; sepals lanceolate, twice the length of the linear bractlets; petals strap-shaped, emarginate, slightly exceeding the sepals, white, often tinged with purple.

Dry soils, on the margins of mountain meadows, Transition and Canadian Zones; southern Sierra Nevada, California. Type locality: headwaters of Kern River, California. June–Aug.

Horkelia purpurascens subsp. *Congdonis* (Rydb.) Abrams (*Horkelia Congdonis* Rydb. Bull. Torrey Club 26: 543. 1899.) Distinguished mainly from the typical species by the glandular stems, and the obtuse petals. Mainly eastern slopes of the southern Sierra Nevada, California. Type locality: Casa Diablo, Mono County, California.

11. *IVÈSIA* Torr. & Gray, Pacif. R. Rep. 6³: 72. 1857.

Perennials with thick erect rootstocks. Leaves mostly basal and numerous, pinnate, the leaflets numerous, small, more or less crowded and imbricate. Flowers 5-merous, in open or dense cymes. Hypanthium campanulate or commonly saucer-shaped, bearing bractlets alternate with the 5 sepals. Petals white or yellow, oblanceolate and clawed or nearly orbicular and clawless. Stamens 5 or 20 (rarely 10 or 15), inserted in the throat of the hypanthium; filaments filiform, except in *I. argyrocoma*. Pistils 1–15, surrounded

by a ring of bristles. Styles terminal or nearly so, long and slender. Ovules and seeds pendulous and anatropous. [Name in honor of Dr. Eli Ives.]

A west American genus of about 20 species. Type species, *Ivesia Gordonii* (Hook.) Torr. & Gray.

Pistils solitary; anthers opening by subterminal pores; leaflets closely imbricate, densely silvery-silky; stamens 15. 1. *I. santolinoides*.

Pistils 2 to many (rarely reduced to 1); anthers opening by longitudinal slits.

Stamens 15 or 20.

Inner row of stamens inserted at the edge of the receptacle; stamens 20; caespitose dwarf plants, with few-flowered cymes.

Petals white, obovate, equaling the sepals.

2. *I. callida*.

Petals yellow, linear, much shorter than the sepals.

3. *I. Jaegeri*.

Inner stamens inserted some distance from the edge of receptacle; stamens 15 or 20.

Filaments dilated below; leaflets closely imbricate, densely silvery-silky; stamens 20.

4. *I. argyrocoma*.

Filaments slender, not dilated below.

Plants tomentose or villous-tomentose, hypanthium campanulate.

Pistils 9-12; petals yellow.

5. *I. campestris*.

Pistils 2-7; petals cream-colored or white.

Stamens 15; petals white.

6. *I. unguiculata*.

Stamens 20; petals cream-colored.

Pistils 2 or 3; hypanthium pilose within.

7. *I. Pickeringii*.

Pistils 4-7; hypanthium glabrous within.

8. *I. sericoleuca*.

Plants glabrous or essentially so; hypanthium saucer-shaped.

9. *I. Kingii*.

Stamens 5 or 10.

Stamens 10; leaflets finely glandular-puberulent.

10. *I. pygmaea*.

Stamens 5.

Inflorescence of corymbose or subcapitate cymes; leaflets divided to near the base.

Leaves silky-pubescent.

Leaves vermiform with minute closely imbricate and densely white-silky leaflets.

11. *I. Muirii*.

Leaves not vermiform; leaflets not densely imbricate, somewhat silky-pubescent but greenish, 10-20 mm. long.

12. *I. Webberi*.

Leaves glandular-pubescent or glabrate.

Leaflets not bristle-tipped.

Hypanthium shallowly cupulate; petals exceeding the sepals.

13. *I. Tweedyi*.

Hypanthium campanulate; petals usually much shorter than the sepals.

Pistils 1-5, usually 2; styles filiform elongated, not glandular.

14. *I. Gordonii*.

Pistils 9-20; styles short, glandular.

15. *I. lycopodioides*.

Leaflets bristle-tipped, densely glandular-pubescent.

16. *I. Shockleyi*.

Inflorescence an open lax cyme; pedicels very slender; leaflets merely toothed or incised.

17. *I. Baileyi*.

1. *Ivesia santolinoides* A. Gray. Mouse-tail Ivesia. Fig. 2398.

Ivesia santolinoides A. Gray, Proc. Amer. Acad. 6: 531. 1865.

Potentilla santolinoides Greene, Pittonia 1: 106. 1887.

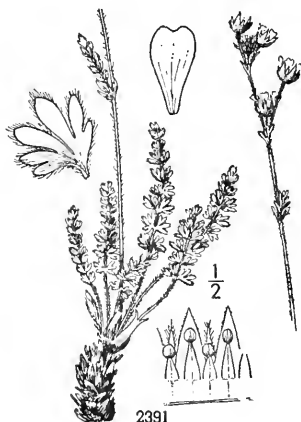
Stellariopsis santolinoides Rydb. Mem. Dept. Bot. Columbia Univ. 2: 155. 1898.

Stems several, erect, from a short erect caudex, hairy toward the base. Basal leaves 3-10 cm. long, densely silky, terete and resembling a mouse-tail from the minute numerous densely imbricated leaflets; cyme much branched, open, the branches and pedicels very slender; hypanthium 3 mm. broad in fruit, sparsely pubescent; sepals 1.5 mm. long, twice the length of the minute bractlets; petals white, broadly ovate, twice as long as the sepals; stamens 15, filaments filiform; pistil 1.

Dry, gravelly open places, Transition Zone; Sierra Nevada to the San Bernardino Mountains, California. Type locality: Sierra Nevada, California. June-Aug.



2390. *Horkelia tenuiloba*



2391. *Horkelia hispidula*



2392. *Horkelia Hendersonii*

2. *Ivesia cállida* (Hall) Rydb. Tahquitz Ivesia. Fig. 2399.

Potentilla cállida Hall, Univ. Calif. Pub. Bot. 1: 86. 1902.

Ivesia cállida Rydb. N. Amer. Fl. 22: 286. 1908.

Potentilla Shockleyi var. *cállida* Jepson, Man. Fl. Pl. Calif. 492. 1925.

Stems from a simple or caespitose caudex, spreading, leafy, 2–5 cm. long; herbage glandular-pubescent and hirsute. Basal leaves 1.5–3 cm. long; leaflets 6–8 pairs, crowded, 2–3 mm. long, entire or divided into 2 unequal segments; cyme few-flowered, open; hypanthium about 2 mm. wide, disciform; sepals lanceolate, 2.5–3.5 mm. long; petals white, obovate, equaling the sepals; stamens 20, inserted close to the white-hirsute receptacle; pistils 4–6; style glandular-thickened.

A local species known only from Tahquitz Peak, San Jacinto Mountains, southern California. July–Aug.

3. *Ivesia Jaègeri* Munz & Jtn. Jaeger's Ivesia. Fig. 2400.

Ivesia Jaegeri Munz & Jtn. Bull. Torrey Club 56: 165. 1929.

Stems from a short simple or caespitose caudex, decumbent, slender, 5–12 cm. long; herbage glandular-puberulent throughout. Basal leaves 3–8 cm. long; leaflets 4–8 pairs, rather distant, 3–6 mm. long, divided nearly or quite to the base into 2–5 oblanceolate or obovate segments; cyme open, with few flowers on filiform pedicels; hypanthium disciform, about 2.5 mm. wide; bractlets ovate, about 0.5 mm. long; sepals lanceolate, 2–3 mm. long; petals yellow, linear, 1 mm. long; stamens 20, the innermost on the rim of the hirsute receptacle; pistils 3–9, style scarcely glandular.

Crevices of rocks, Arid Transition Zone; Clark Mountains, San Bernardino County, California, and Charleston Mountains, Nevada. Type locality: Charleston Resort, Charleston Mountains, Nevada. July–Aug.

4. *Ivesia argyrócoma* Rydb. Silver-haired Ivesia. Fig. 2401.

Horkelia argyrocoma Rydb. Mem. Dept. Bot. Columbia Univ. 2: 144. 1898.

Ivesia argyrocoma Rydb. N. Amer. Fl. 22: 284. 1908.

Stems decumbent or ascending, branching, about 2 dm. long, silky-villous, the lower part and petioles covered with long, spreading, silvery hairs. Leaflets of basal leaves numerous, densely imbricate, 3 mm. long, divided to the base into oblong segments, densely silky-pubescent; cyme dense, becoming open in age; sepals lanceolate-acuminate, 4 mm. long, exceeding the oblong or lanceolate bractlets; petals white, broadly obovate, clawed, exceeding the calyxlobes; stamens 20.

Dry gravelly soils, Arid Transition Zone; San Bernardino Mountains, southern California. Type locality: Bear Valley, San Bernardino Mountains. June–Aug.

5. *Ivesia campéstris* (M. E. Jones) Rydb. Field Ivesia. Fig. 2402.

Potentilla utahensis var. *campestris* M. E. Jones, Proc. Calif. Acad. II: 5: 679. 1895.

Horkelia campestris Rydb. Mem. Dept. Bot. Columbia Univ. 2: 147. 1898.

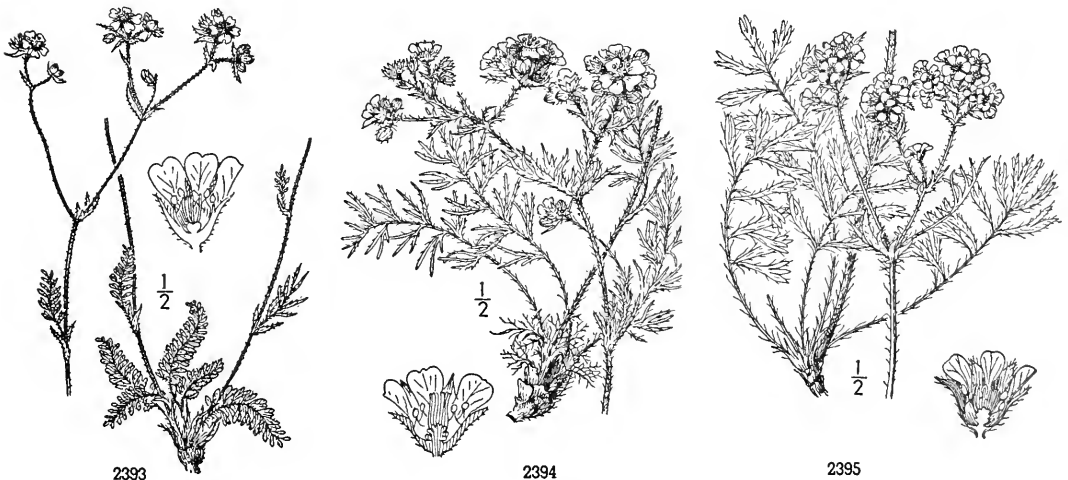
Ivesia campestris Rydb. N. Amer. Fl. 22: 285. 1908.

Horkelia mollis Eastw. Bot. Gaz. 41: 286. 1906.

Potentilla campestris Jepson, Man. Fl. Pl. Calif. 490. 1925.

Stems several, ascending or decumbent, 1–2 dm. long, somewhat silky-villous. Leaflets of basal leaves numerous, crowded, 3–4 mm. long, more or less silky-villous; cyme subcapitate; hypanthium 5 mm. broad; sepals subulate-lanceolate, 2–3 mm. long; petals yellow, spatulate, a little exceeding the sepals; stamens 15–20.

Mountain meadows, Arid Transition and Canadian Zones; southern Sierra Nevada. Type locality: Whitney Meadows, Sierra Nevada, California. June–Aug.



2393. *Horkelia sericata*

2394. *Horkelia daucifolia*

2395. *Horkelia congesta*

6. *Ivesia unguiculata* A. Gray. Yosemite Ivesia. Fig. 2403.

Ivesia unguiculata A. Gray, Proc. Amer. Acad. 7: 339. 1868.

Potentilla unguiculata Hook. f. Bot. Mag. 37: pl. 6560. 1881.

Potentilla ciliata Greene, Pittonia 1: 103. 1887.

Horkelia unguiculata Rydb. Mem. Dept. Bot. Columbia Univ. 2: 146. 1898.

Stems several, decumbent or ascending, 3-4 dm. high, simple, sparingly silky-villous. Basal leaves numerous, canescent, but not densely silky with long hairs; leaflets numerous, crowded, 5-7 mm. long, divided to the base into linear-oblong lobes; cyme subcapitate; hypanthium 4 mm. broad, slightly silky; sepals 2-3 mm. long, broadly lanceolate; petals white, broadly spatulate or obovate; stamens 10-15.

Borders of mountain meadows, Arid Transition Zone; Sierra Nevada, Mariposa County to Fresno County, California. Type locality: Westfall's Meadow, Yosemite Valley, California. June-Aug.

7. *Ivesia Pickeringii* Torr. Pickering's Ivesia. Fig. 2404.

Ivesia Pickeringii Torr. ex A. Gray, Proc. Amer. Acad. 6: 531. 1865. [Bot. Wilkes Exp. 288. pl. 4. 1874.]

Potentilla Pickeringii Greene, Pittonia 1: 105. 1887.

Horkelia Pickeringii Rydb. Mem. Dept. Bot. Columbia Univ. 2: 145. 1898.

Stems ascending, leafy, 25-45 cm. long; caudex stout, woody, covered with glabrous old leaf-bases, plant densely and finely villous, minutely viscid. Basal leaves 8-18 cm. long; leaflets crowded or imbricate, 2-5 mm. long, parted to the base, the lobes oblong to obovate; cyme corymbosely branched, the flowers scattered or in subcapitate glomerules; hypanthium campanulate, 2-2.5 mm. deep, pilose within; bractlets lanceolate, 4-5 mm. long; petals broadly spatulate, slightly exceeding the sepals; filaments filiform; pistils 2, rarely 3; achenes ellipsoid, narrowed to a blunt apical beak, often similarly beaked at the base.

Mountain slopes, Arid Transition Zone; Siskiyou and Trinity Counties, California. Type locality: on the Klamath River, according to Torrey, probably on the Sacramento according to Gray. July-Sept.



2396. *Horkelia tridentata*

2397. *Horkelia purpurascens*

2398. *Ivesia santolinoides*

2399. *Ivesia callida*

2400. *Ivesia Jaegeri*

2401. *Ivesia argyrocoma*

8. *Ivesia sericoleuca* Rydb. Plumas Ivesia. Fig. 2405.*Horkelia sericoleuca* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 144. pl. 85. 1898.*Ivesia sericoleuca* Rydb. N. Amer. Fl. 22: 284. 1908.

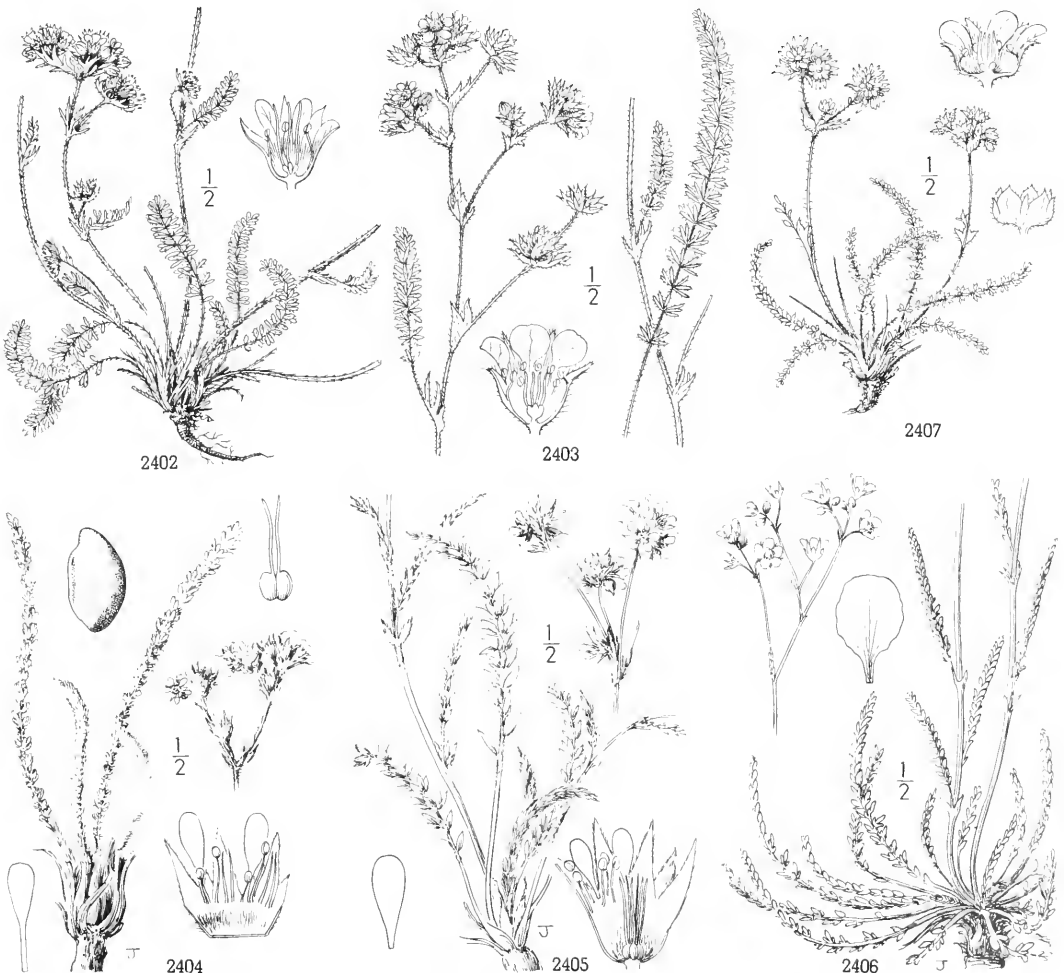
Stems decumbent or ascending, 15–40 cm. high; caudex woody, covered with densely hirsute old leaf-bases; plant more or less densely white-sericeous to tomentose. Basal leaves 10–25 cm. long; leaflets crowded or imbricate, 5–15 mm. long, divided to the base into 2–4 oblong to elliptic lobes; cymes dense, many-flowered, or when open the flowers clustered in glomerules; hypanthium campanulate, 2–2.5 mm. deep, glabrous within; bractlets narrowly lanceolate, about half as long as sepals; sepals lanceolate, acuminate, 3.5–5.5 mm. long; petals exceeding sepals; stamens 20, filaments filiform; pistils 4–7; achenes smooth, pyriform.

Dry flats and slopes, Arid Transition Zone; eastern slopes of the Sierra Nevada, Plumas County to Nevada County, California. Type locality: Sierra County, California. June–Sept.

9. *Ivesia Kingii* S. Wats. King's or Alkali Ivesia. Fig. 2406.*Ivesia Kingii* S. Wats. Bot. King Expl. 91, 448. 1871.*Potentilla Kingii* Greene, Pittonia 1: 105. 1887.*Horkelia Kingii* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 148. 1898.

Stems several from thick perennial root, decumbent or ascending, 15–30 cm. high, nearly or quite glabrous. Basal leaves 6–10 cm. long; leaflets crowded, 3-parted, the segments oblong to rounded, entire, 2–6 mm. long, glabrous and glaucous or rarely ciliate on the margins; upper cauline leaves with simple leaflets; cymes in a loose panicle; hypanthium sparsely pubescent without, glabrous within, bractlets subulate; petals white, exceeding the sepals, clawed, the blades orbicular; stamens 15–20; pistils 2–8.

Alkaline soils, Upper Sonoran and Arid Transition Zones; western Nevada and Mono County, California, to western Utah. Type locality: "Monitor, Diamond and Ruby Valleys, Nevada; 6,000 feet altitude." July–Aug.



2402. *Ivesia campestris*
2403. *Ivesia unguiculata*

2404. *Ivesia Pickeringii*
2405. *Ivesia sericoleuca*

2406. *Ivesia Kingii*
2407. *Ivesia pygmaea*

10. *Ivesia pygmaea* A. Gray. Dwarf Ivesia. Fig. 2407.

Ivesia pygmaea A. Gray, Proc. Amer. Acad. 6: 531. 1865.

Ivesia Gordonii var. *pygmaea* S. Wats. Bot. Calif. 1: 183. 1876.

Potentilla decipiens Greene, Pittonia 1: 106, as to synonyms. 1887.

Horkelia pygmaea Rydb. Mem. Dept. Bot. Columbia Univ. 2: 152. 1898.

Ivesia chaetophora Rydb. N. Amer. Fl. 22: 290. 1908.

Stems scapose, 4–12 cm. high, glandular-puberulent. Basal leaves numerous, 2–5 cm. long, finely glandular-puberulent; leaflets numerous, densely crowded, 1–2 mm. long, divided to the base into oblong or oval thick segments, usually tipped with bristles; cyme subcapitate; hypanthium glandular-hirsute, 4 mm. broad; petals yellow, obovate, slightly exceeding the triangular-lanceolate sepals; stamens 10.

Rocky alpine slopes, Arctic-Alpine Zone; Sierra Nevada, California, and western Nevada. Type locality: Sierra Nevada. July–Aug.

11. *Ivesia Muirii* A. Gray. Muir's Ivesia. Fig. 2408.

Ivesia Muirii A. Gray, Proc. Amer. Acad. 8: 627. 1873.

Potentilla Muirii Greene, Pittonia 1: 106. 1887.

Horkelia Muirii Rydb. Mem. Dept. Bot. Columbia Univ. 2: 148. 1898.

Horkelia Chandleri Rydb. Bull. Torrey Club 28: 177. 1901.

Ivesia Chandleri Rydb. N. Amer. Fl. 22: 286. 1908.

Stem from a short caespitose caudex, 2–16 cm. high, simple, silky-villous. Basal leaves, 2–5 cm. long, densely white-silky, terete and wormlike from the numerous small densely imbricate leaflets; hypanthium cupulate, 3 mm. broad; sepals triangular-ovate, 2 mm. long, a third longer than the linear bractlets; petals yellow, linear, 1.5 mm. long; stamens mostly 5.

Alpine peaks above timber line, Boreal Zones; Sierra Nevada crest from Tuolumne and Mono Counties to Fresno County, California. Type locality: Mount Hoffmann, Sierra Nevada, California. July–Aug.

12. *Ivesia Webberi* A. Gray. Webber's Ivesia. Fig. 2409.

Ivesia Webberi A. Gray, Proc. Amer. Acad. 10: 71. 1874.

Potentilla Webberi Greene, Pittonia 1: 105. 1887.

Horkelia Webberi Rydb. Mem. Dept. Bot. Columbia Univ. 2: 149. 1898.

Stems several from a caespitose caudex, decumbent, 5–15 cm. long, glabrate. Basal leaves 3–4 cm. long, the petioles with long fine silky hairs; leaflets 8–10 pairs, grayish silky but not densely so, 1 cm. long, divided to the base into linear or lanceolate acute segments; cyme subcapitate; hypanthium cupulate, 4 mm. broad; sepals ovate or ovate-lanceolate, 4 mm. long, exceeding the linear bractlets; petals yellow, oblanceolate, scarcely as long as the sepals; stamens 5.

Dry barren ground, Arid Transition and Canadian Zones; northern Sierra Nevada, especially the eastern slopes of Plumas and Sierra Counties, California, also Washoe County, western Nevada. Type locality: Sierra Valley, California. June–Aug.

13. *Ivesia Tweedyi* Rydb. Tweedy's Ivesia. Fig. 2410.

Ivesia Tweedyi Rydb. N. Amer. Fl. 22: 287. 1908.

Horkelia Tweedyi Nels. & Macbr. Bot. Gaz. 61: 31. 1916.

Stems several, decumbent or ascending from a caespitose caudex, 1–2 dm. high, glandular-puberulent. Basal leaves numerous, 5–8 cm. long; leaflets 15–20 pairs, 4–8 mm. long, divided to the base into 3–5 linear or oblong-oblanceolate segments, glandular-puberulent; cymes open, with ascending branches; hypanthium 3 mm. broad, cupulate, slightly short-villous and glandular-

2408. *Ivesia Muirii*2409. *Ivesia Webberi*2410. *Ivesia Tweedyi*

puberulent; sepals triangular-lanceolate, 2.5 mm. long, longer than the narrowly linear bractlets; petals yellow, spatulate, slightly exceeding the sepals; stamens 5.

Alpine slopes, Hudsonian and Arctic Zones; Wenatchee Mountains, Washington; also the Coeur d'Alenes, Idaho. Type locality: "Yakima Region, Washington." July-Aug.

14. *Ivesia Gordonii* (Hook.) Torr. & Gray. Gordon's Ivesia. Fig. 2411.

Horkelia Gordonii Hook. Kew Journ. Bot. 5: 341. 1853.

Ivesia Gordonii Torr. & Gray in Newb. Pacif. R. Rep. 63: 72. 1857.

Potentilla Gordonii Greene, Pittonia 1: 106. 1887.

Ivesia alpicola Rydb. Howell, Fl. N.W. Amer. 1: 182. 1898.

Horkelia Gordonii var. *alpicola* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 152. 1898.

Stems subscapose from a short cespitose caudex, minutely glandular-puberulent, 1-2 dm. high. Basal leaves numerous, puberulent; leaflets 10-20 crowded pairs, 5-12 mm. long, divided into 3-5 broadly oblong segments; cyme capitate; hypanthium 4-5 mm. broad, villous-pubescent and glandular; sepals ovate, 5 mm. long, twice the length of the linear bractlets; petals yellow, shorter than the sepals; stamens 5; pistils 1-6.

Alpine slopes, Arctic-Alpine Zone; southern Washington to northern California, Montana, and Colorado. Type locality: upper Platte River. July-Aug.

15. *Ivesia lycopodioides* A. Gray. Club-moss Ivesia. Fig. 2412.

Ivesia lycopodioides A. Gray, Proc. Amer. Acad. 6: 530. 1865.

Ivesia Gordonii var. *lycopodioides* S. Wats. Bot. Calif. 1: 183. 1876.

Potentilla Gordonii var. *lycopodioides* Greene, Pittonia 1: 106. 1887.

Horkelia lycopodioides Rydb. Mem. Dept. Bot. Columbia Univ. 2: 151. 1898.

Stems scapose from a densely cespitose caudex, glabrous, less than 5 cm. high. Basal leaves crowded, about 3 cm. long, glabrous; leaflets numerous, more or less imbricate, 1-2 mm. long; cyme few-flowered; hypanthium 3 mm. broad, glabrous or puberulent, the lobes 2 mm. long, about a third longer than the oblong bractlets; petals oblong-ob lanceolate, about equaling the sepals, pilose; stamens 5; filaments and styles 1 mm. long.

Summits of high mountain peaks, Arctic-Alpine Zone; central Sierra Nevada, California. Type locality: Mount Dana, 11,000-12,000 feet altitude. July-Aug.

Ivesia lycopodioides subsp. *scandulàris* (Rydb.) Keck, Lloydia 1: 118. 1938. (*Ivesia scandularis* Rydb. N. Amer. Fl. 22: 228. 1908.) Alpine dwarf like the typical species, but leaves densely puberulent and less viscid and the leaflets villous-ciliate. Alpine meadows, Boreal Zones; White Mountains, Mono County, and Sierra Nevada, Inyo County, California. Type locality: White Mountains, elevation 12,000 feet, California.

Ivesia lycopodioides subsp. *megalopectala* (Rydb.) Keck, Lloydia 1: 119. 1938. (*Ivesia megalopetala* Rydb. N. Amer. Fl. 22: 289. 1908.) Stems ascending, 10-25 cm. long; herbage glabrate, sparsely glandular with sessile glands. Leaves approximate but not imbricate, the segments linear to spatulate, thinner; flowers about 10 mm. broad; filaments and styles 2 mm. long. Subalpine meadows, Boreal Zone; Sierra Nevada from Tuolumne County to southeastern Tulare County, California. Type locality: Mount Dana, California.

16. *Ivesia Shockleyi* S. Wats. Shockley's Ivesia. Fig. 2413.

Ivesia Shockleyi S. Wats. Proc. Amer. Acad. 23: 263. 1888.

Horkelia Shockleyi Rydb. Mem. Dept. Bot. Columbia Univ. 2: 153. 1898.

Stems subscapose from a densely cespitose caudex, glandular-pubescent, 2-10 cm. high. Basal leaves numerous, 2-6 cm. long; leaflets 8-12 pairs, crowded, 2-4 mm. long, cleft to the base into several obovate thick segments, densely glandular-pubescent and with a few scattered cilia, bristle-tipped; cyme open; hypanthium 3 mm. broad, glandular-pubescent; sepals ovate, twice the length of the ovate bractlets; petals about equaling the sepals; stamens 5.

Rocky alpine slopes, Boreal Zones; Sierra Nevada and White Mountains from Placer County to Inyo County, California, and western Nevada. Type locality: summit of Silver Peak, Alpine County, California. July-Sept.

17. *Ivesia Baileyi* S. Wats. Bailey's Ivesia. Fig. 2414.

Ivesia Baileyi S. Wats. Bot. King Expl. 90. 1871.

Potentilla Baileyi Greene, Pittonia 1: 105. 1887.

Horkelia Baileyi Rydb. Mem. Dept. Bot. Columbia Univ. 2: 154. 1898.

Stems several, from a cespitose caudex, decumbent or ascending, 1-3 dm. long, finely pubescent or glabrate. Basal leaves many, 5-15 cm. long; leaflets 4-6 rather distinct pairs, pubescent or glabrate, 5-10 mm. long, broadly obovate, deeply incised into broadly obovate segments; stem leaves with 2-3 pairs of leaflets; inflorescence leafy-bracted, open and truly cymose; pedicels very slender, often 15-20 mm. long; hypanthium saucer-shaped, 4-5 mm. broad, glandular-pubescent, distinctly 5-angled in fruit; sepals ovate, 2 mm. long, about twice the length of the linear-oblong bractlets; petals yellow, spatulate, shorter than the sepals; stamens 5.

Mountain cliffs, Boreal Zones; southeastern Oregon, southern Idaho, and adjacent Nevada. Type locality: Wright's Cañon, West Humboldt Mountains, Nevada. July-Aug.

12. *POTENTILLA* L. Sp. Pl. 495. 1753.

Perennial or rarely annual herbs with digitately or pinnately compound leaves and cymose or solitary, yellow, perfect flowers. Hypanthium persistent, concave or hemispherical, 5-bracteolate. Sepals 5. Petals 5, mostly obovate and emarginate. Stamens commonly 20, inserted on an annular disk very near the base of the receptacle; filaments filiform or spatulate but not flattened. Pistils many, becoming dry achenes in fruit, inserted on a hemispherical or conical receptacle; style terminal or nearly so, lateral or basal, deciduous; ovules pendulous, attached at union of style and ovary, anatropous,

amphitropous or orthotropous. [Name diminutive of *potens*, powerful, from the medicinal properties of some species.]

About 300 species, native of the north temperate zone. Type species, *Potentilla reptans* L.

Styles terminal to lateral; ovules anatropous or amphitropous.

Styles terminal or subterminal; ovules pendulous.

Flowers solitary, axillary, long-peduncled; 4-merous.

1. *P. procumbens*.

Flowers cymose; 5-merous.

Styles fusiform and glandular.

Annuals or biennials; cymes leafy, many-flowered.

Leaflets toothed.

Achenes gibbous on the inner side; leaves pinnate.

2. *P. paradoxa*.

Achenes not gibbous; leaves 3-foliolate or the lower pinnately 5-foliolate.

Leaves pinnately 5-foliolate below, 3-foliolate above.

3. *P. rivalis*.

Leaves all 3-foliolate.

Stems soft-pubescent; stamens usually 10; petals about half the length of the sepals.

Low, diffusely branched; the branches decumbent; soft-pubescent or glabrate.

4. *P. millegrana*.

Erect, 3-5 dm. high, soft glandular-pubescent.

5. *P. biennis*.

Stems stout, erect, hirsute below; stamens 15-20; petals about equaling the sepals.

6. *P. monspeliensis*.

Leaflets divided to near the base into 3-5 linear segments.

7. *P. Newberryi*.

Perennials, cymes not very leafy, few-flowered; leaves odd-pinnate.

8. *P. pseudosericea*.

Styles filiform, not glandular at base; perennials.

Leaves digitate, see also *P. diversifolia*.

Basal leaves with 5-9 leaflets.

Plants erect or ascending.

Leaflets white-tomentose beneath.

Leaflets toothed or lobed scarcely half way to the midrib, the teeth oblong to lanceolate.

Leaflets densely white-tomentose beneath; stems slender.

9. *P. gracilis*.

Leaflets grayish, rather sparsely tomentose beneath; stems stout.

10. *P. glomerata*.

Leaflets toothed well beyond half way to the midrib.

Plants 4-8 dm. high; leaflets with short tomentum.

Lobes of the leaflets about 1 cm. long, oblong-linear, scarcely revolute.

11. *P. Blaschkeana*.

Lobes of the leaflets extending almost to the midrib, 1-2 cm. long, narrowly linear and revolute.

12. *P. flabelliformis*.

Plants scarcely 2 dm. high, more or less densely villous-tomentose throughout.

15. *P. fastigiata*.

Leaflets more or less silky-pubescent beneath, not tomentose, more or less glandular tomentiferous.

Leaflets strongly nerved, oblanceolate, sparsely appressed-pubescent beneath.

13. *P. Nuttallii*.

Leaflets not strongly nerved, obovate; more or less densely silky-pubescent beneath.

14. *P. etomentosa*.

Plants prostrate or nearly so, silky-villous and more or less glandular throughout; leaflets 5, crenate at the summit.

16. *P. Wheeleri*.

Basal leaves 3-foliolate.

Leaves more or less tomentose beneath.

Stems 1-2-flowered; leaflets deeply lobed.

17. *P. uniflora*.

Stems several-flowered; leaflets crenate-serrate, *Fragaria*-like.

18. *P. villosa*.

Leaves sparsely pubescent or glabrate.

19. *P. flabellifolia*.

Leaves odd-pinnate, or digitate in *P. diversifolia*.

Petals acutish or acuminate at the apex.

20. *P. saxosa*.

Petals rounded or emarginate at the apex.

Leaflets digitate or a few odd-pinnate, 5-7, deeply cleft.

21. *P. diversifolia*.

Leaflets strictly odd-pinnate.

Leaves with 3-5 leaflets.

Leaflets 5.

22. *P. brevifolia*.

Leaflets 3, the terminal long-petiolulate.

23. *P. Grayi*.

Leaves with 7 or more leaflets.

Leaves canescent, silky or tomentose at least beneath.

24. *P. Breweri*.

Leaves green and glabrate or merely strigose.

Pedicels at least in fruit recurved; stems diffuse or spreading.

Stems and petioles rather copiously villous with long ascending or spreading hairs.

25. *P. klanathensis*.

Stems and petioles sparingly strigose with short appressed hairs.

Bractlets lanceolate, acute, equaling the lobes or nearly so.

26. *P. millefolia*.

Bractlets oblong-elliptical, obtuse, much shorter than the lobes.

27. *P. Hickmanii*.

Pedicels straight and erect or ascending; stems erect or ascending.

Leaflets 5-11.

28. *P. Drummondii*.

Leaflets 17-27.

29. *P. multijuga*.

Styles lateral; ovules ascending, amphitropous.

Undershrubs; achenes pubescent.

30. *P. fruticosa*.

Herbs; achenes glabrous.

Petals yellow; receptacle not enlarged in fruit.

Stems and petioles pubescent with ultimately spreading hairs; achenes with a deep dorsal groove.

31. *P. Anserina*.

Stems and petioles glabrous or nearly so; achenes without a groove.

32. *P. pacifica*.

Petals red-purple, acute; receptacle somewhat enlarged and spongy in fruit.

33. *P. palustris*.

Styles basal; ovule ascending; orthotropous; perennial herbs with pinnate leaves.

Styles fusiform, less than twice as long as the ovaries.

Seeds smooth, shining, light brown, oblong-ovoid, about twice as long as broad; petals cream-white.

Petals scarcely longer or usually shorter than the sepals.

Stems leafy, stout, glandular-villous; flowers many in a narrow crowded cymose panicle.

34. *P. Convallaria*.

Stems subscapose, the stem leaves few and reduced; flowers few in open cymes.

35. *P. Hansenii*.

Petals well exceeding the sepals.

Sepals lanceolate or ovate-lanceolate; bractlets lanceolate to linear.

36. *P. ashlandica*.

Sepals broadly ovate; bractlets elliptic to oval.

37. *P. pumila*.

Seeds finely reticulate or veined, dull dark brown, obliquely and broadly ovoid, often nearly as broad as long; stems leafy, glandular-villous.

Petals not reflexed in anthesis; seeds reticulate, sometimes obscurely so.

Petals yellow; sepals mainly ovate-lanceolate-acute.

38. *P. glandulosa*.

Petals cream-white; sepals rounded or obtuse at apex.

39. *P. Wrangelliana*.

Petals reflexed in anthesis, yellow; seeds conspicuously veined.

40. *P. reflexa*.

Styles filiform or nearly so, more than twice the length of the ovaries.

41. *P. rhomboidea*.

1. *Potentilla procumbens* Sibth. Wood Cinquefoil. Fig. 2415.

Tormentilla reptans L. Sp. Pl. 500. 1753. Not *P. reptans* L.

Potentilla procumbens Sibth. Fl. Oxon. 162. 1794.

Potentilla nemoralis Nestl. Mon. Pot. 65. 1816.

Stems slender, prostrate and often rooting at the nodes, strigose or glabrate. Stipules oblong-lanceolate, usually entire; leaves digitally 5-foliate, the petioles 3–10 cm. long; leaflets cuneate to oblanceolate, obtuse or rounded at the apex, 1–3 cm. long, crenate or dentate, appressed-pubescent on both surfaces or glabrate in age; bractlets ovate or elliptical, 5–10 mm. long, usually well exceeding the ovate sepals; petals 4, obcordate, 6–10 mm. long.

Widely distributed over Europe, naturalized in Labrador, Nova Scotia, California, and Oregon. April–July.

2. *Potentilla paradoxa* Nutt. Bushy Cinquefoil. Fig. 2416.

Potentilla paradoxa Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 437. 1840.

Annual or biennial with decumbent or erect, simple or bushy stems, sparsely pubescent, 3–6 dm. high. Stipules ovate-lanceolate, usually entire, ciliate; leaves petioled, pinnately 7–11-foliate; leaflets obovate or oblong, 1–2 cm. long, deeply crenate, in age glabrous; flowers in leafy-bracted cymes; hypanthium sparingly hairy, 7–9 mm. broad; bractlets about equaling the oblong-ovate sepals, 3–4 mm. long; petals obovate-cuneate, slightly exceeding the sepals; achenes with a thick corky swelling on the inner side.

In sandy bottom land, Transition Zone; Ontario and New York to New Mexico and eastern Washington. Type locality: banks of the Ohio River. May–July.

3. *Potentilla rivalis* Nutt. River Cinquefoil. Fig. 2417.

Potentilla rivalis Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 437. 1840.

Tridophyllum rivale Greene, Leaflets Bot. Obs. 1: 189. 1905.

Stems erect, simple below, branched above, 3–6 dm. high, finely villous-hirsute and somewhat viscid, leafy. Lower leaves pinnately 5-foliate, and the upper leaflet often ternate; leaflets 2–5 cm. long, obovate, with coarse ovate teeth; cyme with ascending branches, leafy; flowers short-pedicelled; hypanthium hirsute, about 5 mm. broad; bractlets oblong, about 3 mm. long; sepals ovate, acute, 3–4 mm. long; petals yellow, cuneate, much shorter than the sepals; stamens about 10; achenes smooth.

Moist bottom lands, Transition and Sonoran Zones; British Columbia to southern California, east to Saskatchewan and Mexico. Type locality: Lewis River, collected by Nuttall. April–Sept.

4. *Potentilla millegrana* Engelm. Diffuse Cinquefoil. Fig. 2418.

Potentilla millegrana Engelm. ex Lehm. Ind. Sem. Hamb. 1849: Add. 12. 1849.

Potentilla rivalis var. *millegrana* S. Wats. Proc. Amer. Acad. 8: 553. 1873.

Potentilla leucocarpa Rydb. in Britt. & Brown, Ill. Fl. 2: 212. 1897.

Stems usually diffusely branched, weak and decumbent, 15–30 cm. high, soft villous-pubescent or glabrate. Leaves 3-foliate, more or less pubescent; leaflets oblong-cuneate, 1–6 cm. long, thin, deeply serrate; cyme spreading, its leaves bractlike; hypanthium soft-pubescent, 4–5 mm. broad; bractlets and sepals oblong-ovate, 3–4 mm. long; petals pale yellow, about half the length of the sepals; stamens usually 10; achenes smooth, light colored.

Sandy bottom lands, mainly Transition Zone; Washington and Manitoba to California, Illinois, and New Mexico. Type locality: St. Louis, Missouri. April–Oct.

5. *Potentilla biennis* Greene. Biennial Cinquefoil. Fig. 2419.

Potentilla biennis Greene, Fl. Fran. 1: 65. 1891.

Potentilla lateriflora Rydb. Bull. Torrey Club 23: 261. 1896.

Tridophyllum bienne Greene, Leaflets Bot. Obs. 1: 189. 1905.

Stems several with erect branches, 3–5 dm. high, rather densely pubescent and glandular-viscid. Leaves 3-foliolate, more or less pubescent; leaflets broadly obovate, 2–4 cm. long, coarsely crenate; cymes often appearing like leafy racemes; hypanthium glandular-pubescent; bractlets a little narrower and shorter than the ovate-acute sepals; petals yellow, much shorter than the sepals; stamens about 10; achenes whitish, smooth.

Moist, usually sandy soils, mainly Transition Zone; British Columbia and Saskatchewan to Colorado, Arizona, and Lower California. Type locality: Butte County, California. May–Aug.

6. *Potentilla monspeliensis* L. Rough Cinquefoil. Fig. 2420.

Potentilla monspeliensis L. Sp. Pl. 499. 1753.

Potentilla grossa Dougl. ex Hook. Fl. Bor. Amer. 1: 193, as synonym. 1832.

Tridophyllum monspeliensis Greene, Leaflets Bot. Obs. 1: 189. 1905.

Stems erect, stout, branched above, 2–7 dm. high, hirsute. Leaves 3-foliolate, more or less hirsute; leaflets 3–5 cm. long, narrowly obovate, serrate with broad teeth; cyme leafy; hypanthium hirsute, 7–8 mm. broad; sepals 4–5 mm. long; bractlets about equaling the lobes in length but narrower; petals yellow, nearly equaling the sepals; stamens generally 20; achenes rugulose when mature.

Moist rich soils, Transition and Boreal Zones; Alaska and Labrador to Mexico, also in Europe and Asia. Type locality: Botanical Garden, Montpellier, France. June–Sept.

7. *Potentilla Newberryi* A. Gray. Newberry's Cinquefoil. Fig. 2421.

Potentilla Newberryi A. Gray, Proc. Amer. Acad. 6: 532. 1865.

Potentilla Newberryi var. *arenicola* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 112. 1898.

Stems erect or spreading, from a biennial or perhaps perennial root, 2–4 dm. high, sparsely silky-villous. Basal leaves pinnate, silky-villous; leaflets 3–10 pairs, divided to near the base into 3–5 oblong-spatulate segments; stem leaves similar but shorter and with 2–4 less divided leaflets; cyme diffuse, the pedicels slender, recurved; hypanthium villous, about 5 mm. broad; sepals ovate-lanceolate, 4 mm. long, the bractlets similar; petals white, obcordate, exceeding the sepals; stamens 20; receptacle beset with bristles.

Upper Sonoran Zone; eastern Oregon and northeastern California. Type locality: banks of Rhett Lake, California or Oregon. May–July.

8. *Potentilla pseudosericea* Rydb. Strigose Cinquefoil. Fig. 2422.

Potentilla pseudosericea Rydb. Mem. Dept. Bot. Columbia Univ. 2: 98. 1898.

Perennial, with a short caespitose caudex, the stems 1–4 dm. high, densely puberulent and villous with long spreading hairs. Basal leaves with 7–11 leaflets; petioles puberulent and long-villous with spreading hairs; leaflets 1–5 cm. long, oblanceolate, green above and strigose-pubescent, canescent beneath with a dense tomentum, deeply cleft with linear or linear-lanceolate revolute lobes; flowers congested; hypanthium 5–7 mm. broad, villous; sepals ovate 5, long, slightly exceeding the lanceolate bractlets; petals obovate, about 7 mm. long; stamens 20; styles glandular at base.

Dry plains and hillsides, Arid Transition and Boreal Zones; eastern British Columbia and plains of the Hudson Bay to Kansas and New Mexico. White Mountains, California, is the only known locality in the Pacific States. Type locality: plains of the Missouri. May–June.

9. *Potentilla grácilis* Dougl. Slender Cinquefoil. Fig. 2423.

Potentilla gracilis Dougl. ex Hook. Bot. Mag. pl. 2984. 1830.

Potentilla longipedunculata Rydb. Mem. Dept. Bot. Columbia Univ. 2: 39. 1898.

Potentilla macropetala Rydb. N. Amer. Fl. 22: 313. 1908.

Stems erect or ascending, slender, 4–7 dm. high, more or less silky-villous. Stipules lanceolate, entire or with 1 or 2 teeth; basal leaves digitate with 5–7 leaflets, the petioles slender, silky-villous; leaflets oblanceolate, 3–6 cm. long, green but more or less silky-pubescent above, densely and finely white-tomentose beneath, divided about half way to the midrib into lanceolate-triangular coarse teeth; cyme many-flowered; hypanthium silky-pubescent, 8–10 mm. broad in fruit; bractlets lanceolate, shorter than the acuminate sepals; petals obcordate, often over 1 cm. long; stamens about 20.

Usually in moist places, stream banks or mountain meadows, Transition and Boreal Zones; coastal Alaska and British Columbia southward west of the Cascade Mountains to northern California. Type locality: banks of the Columbia River. May–July.

10. *Potentilla glomerata* A. Nels. Great Basin Cinquefoil. Fig. 2424.

Potentilla glomerata A. Nels. Bull. Torrey Club 26: 480. 1899.

Potentilla dichroa Rydb. N. Amer. Fl. 22: 319. 1908.

Stems stout, erect, 4–8 dm. high, rather densely pubescent. Basal leaves 7-foliolate, green but densely appressed-pubescent above, more or less tomentose beneath; leaflets oblanceolate, 4–8 cm. long, toothed nearly half way to the midrib, the teeth lanceolate; cyme at first congested, but later more open; sepals acuminate, 5–8 mm. long; petals 6–8 mm. long.

Low moist ground, Arid Transition and Upper Sonoran Zones; eastern Washington and Montana south to northeastern California and Utah. Type locality: Bear River at Evanston, Wyoming. June–Aug.

11. *Potentilla Blaschkeana* Turcz. Blaschke's Cinquefoil. Fig. 2425.

Potentilla Blaschkeana Turcz. ex Lehm. Hamb. Gart. & Blumenz. 9: 506. 1853.

Potentilla ctenophora Rydb. Mem. Dept. Bot. Columbia Univ. 2: 75. 1898.

Stems stout, erect, 5–8 dm. high, sparingly silky-pubescent. Basal leaves digitate, usually with 7 leaflets, the petioles 5–15 cm. long; leaflets obovate in outline, deeply cleft into linear or oblong divisions; cyme many-flowered; sepals long-acuminate, 5–6 mm. long; petals obcordate, much exceeding the sepals.

Meadows, Transition and Boreal Zones; British Columbia and Alberta to northern California. Type locality: near Fort Ross, California. June–Aug.

Potentilla Blaschkeana var. *permollis* (Rydb.) Wolf, Bibl. Bot. 16: 212. 1908. Leaves and hypanthium densely and softly pubescent, almost velvety. Eastern Washington; originally collected at Endicott, Whitman County, Washington.

12. *Potentilla flabelliformis* Lehm. Fan-shaped Cinquefoil. Fig. 2426.

Potentilla flabelliformis Lehm. Stirp. Pug. 2: 12. 1830.

Potentilla gracilis var. *flabelliformis* Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 440. 1840.

Stems slender, erect, 4–6 dm. high, silky-strigose, branched above. Basal leaves 7-foliolate, silky-pubescent above, densely white-tomentose beneath; leaflets 3–5 cm. long, divided nearly to the midrib into narrowly linear lobes, these revolute on the margin; sepals triangular-lanceolate, acuminate, 4–5 mm. long, slightly exceeded by the petals.

Meadows, Arid Transition Zone; eastern British Columbia and Saskatchewan to northeastern California and Wyoming. Type locality: plains of the Saskatchewan, according to Hooker's Flora. June–Aug.

13. *Potentilla Nuttallii* Lehm. Nuttall's Cinquefoil. Fig. 2427.

Potentilla recta Nutt. Gen. 1: 310. 1818. Not L. 1753.

Potentilla rigida Nutt. Journ. Acad. Phila. 7: 20. 1834. Not Wall. 1828.

Potentilla chrysantha Lehm. in Hook. Fl. Bor. Amer. 1: 193. 1832. Not Trev. 1818.

Potentilla Nuttallii Lehm. Stirp. Pug. 9: 44. 1851.

Potentilla gracilis var. *rigida* S. Wats. Proc. Amer. Acad. 8: 557. 1873.

Stems stout, erect, 6–8 dm. high, sparingly pubescent. Basal leaves usually 7-foliolate, prominently veined, green, sparingly pubescent, not at all tomentose, usually glandular-atomiferous; leaflets oblanceolate, 5–10 cm. long, toothed about half way to the midrib with lanceolate teeth; cyme many-flowered; hypanthium about 1 cm. broad in fruit, the lobes long-acuminate; petals 6–8 mm. long.

Mountain meadows and valleys, Arid Transition and Canadian Zones; British Columbia to Dakota, south to Oregon and Colorado. Type locality: Fort Mandan [North Dakota]. June–Aug.

Rydberg (N. Amer. Fl. 22: 311–312. 1908) has described three segregates of this species (*P. angustata*, *P. grosseserrata*, *P. rectijiformis*) but it is doubtful if the characters relied upon are sufficiently stable to warrant specific distinction.

Potentilla Nuttallii var. *glabrata* Lehm. Rev. Potent. 89. 1856. Leaves glabrous except on the veins beneath, otherwise closely resembling the typical form. Washington and Oregon to Wyoming.

14. *Potentilla etomentosa* Rydb. Sierra *Potentilla*. Fig. 2428.

Potentilla etomentosa Rydb. Bull. Torrey Club 24: 8. 1897.

Potentilla amadorensis Ryb. N. Amer. Fl. 22: 312. 1908.

Stems ascending or decumbent from a thick caudex, 3–5 dm. high, slightly pubescent. Basal leaves usually 5–7-foliolate, sparsely appressed-pubescent above, more or less silky-pubescent beneath but without tomentum; leaflets obovate to broadly oblanceolate, 3–5 cm. long, the teeth broadly lanceolate, sometimes extending half way to the midrib, but usually shorter; petals obcordate, slightly exceeding the ovate-lanceolate sepals.

Moist places, mainly Arid Transition Zone; Sierra Nevada and North Coast Ranges, California, also western Nevada. Type locality: California. June–Aug.

Potentilla etomentosa subsp. *Hallii* (Rydb.) Abrams. (*Potentilla Hallii* Rydb. Bull. Torrey Club 28: 176. 1901.) This has been placed as a variety of *P. gracilis* by Wolf, but it is undoubtedly much more closely related to *P. etomentosa* which it closely resembles in habit and shape of leaves and differs only in the amount of pubescence, the under surface of the leaves being densely silky-pubescent with an obscure tomentum beneath. Mountain meadows, Arid Transition Zone; southern Sierra Nevada to San Diego County, California. Type locality: Pine Ridge, Fresno County, California. Considerable variation occurs in the pubescence and depth of leaf-serration, characters which have led to the following segregates by Rydberg: *P. Parishii*, *P. lasia*, *P. Elmeri*, *P. comosa*, *P. Hasselii*.

15. *Potentilla fastigiata* Nutt. Densely-flowered Cinquefoil. Fig. 2429.

Potentilla fastigiata Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 440. 1840.

Potentilla holopetala var. *fastigiata* Lehm. Stirp. Pug. 9: 46. 1851.

Potentilla gracilis var. *fastigiata* S. Wats. Proc. Amer. Acad. 8: 557. 1873.

Potentilla subvillosa Rydb. N. Amer. Fl. 22: 316. 1908.

Stems low, 1–3 dm. high, ascending, more or less densely silky-villous. Basal leaves 5–7-foliolate, densely white, silky-villous on both surfaces and somewhat tomentose beneath; leaflets obovate, 1–3 cm. long, usually deeply incised; cyme narrow, usually rather dense; hypanthium silky-villous; sepals triangular-ovate, acute, 5 mm. long, slightly exceeded by the petals.

Open grassy places, Arid Transition Zone; Sierra Nevada, California, to Montana, Wyoming, and Utah. Type locality: plains of the Rocky Mountains. June–Aug.



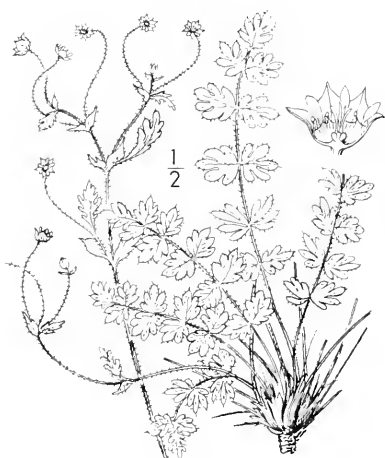
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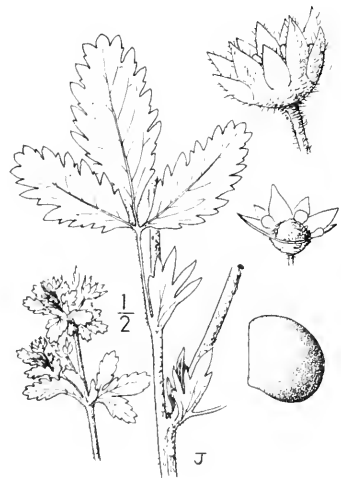
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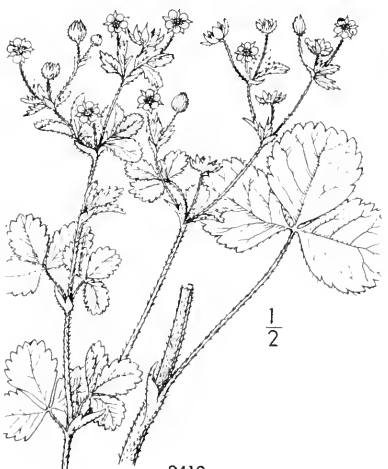
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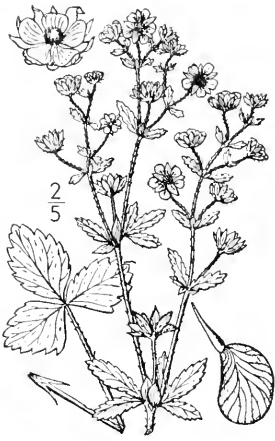


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2411. *Ivesia Gordonii*
 2412. *Ivesia lycopodioides*
 2413. *Ivesia Shockleyi*

2414. *Ivesia Baileyi*
 2415. *Potentilla procumbens*
 2416. *Potentilla paradoxa*

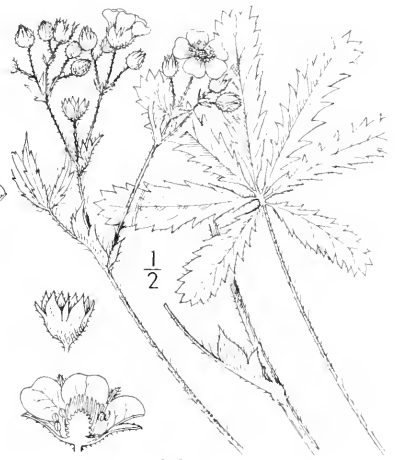
2417. *Potentilla rivalis*
 2418. *Potentilla millegrana*
 2419. *Potentilla biennis*



2420



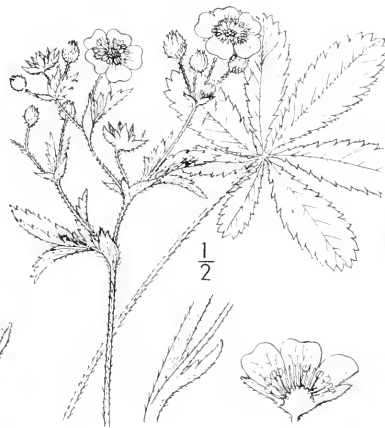
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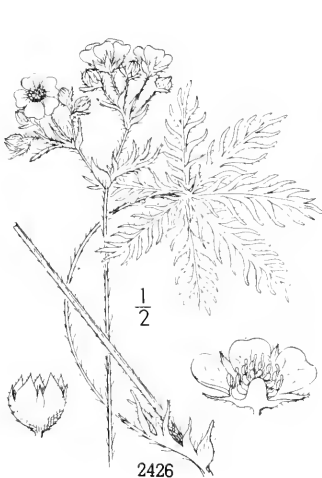
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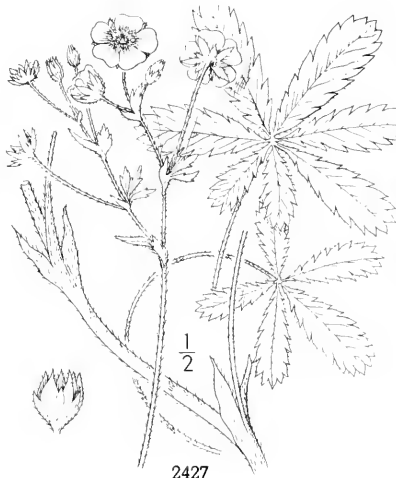
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2420. *Potentilla monspeliensis*
 2421. *Potentilla Newberryi*
 2422. *Potentilla pseudosericea*

2423. *Potentilla gracilis*
 2424. *Potentilla glomerata*
 2425. *Potentilla Blaschkeana*

2426. *Potentilla flabelliformis*
 2427. *Potentilla Nuttallii*
 2428. *Potentilla etomentosa*

16. *Potentilla Wheeleri* S. Wats. Wheeler's Cinquefoil. Fig. 2430.

Potentilla Wheeleri S. Wats. Proc. Amer. Acad. 11: 148. 1876.

Potentilla Wheeleri var. *viscidula* Rydb. Bull. Torrey Club 23: 429. 1896.

Potentilla viscidula Rydb. N. Amer. Fl. 22: 327. 1908.

Potentilla Wheeleri var. *paupercula* Jepson, Man. Fl. Pl. Calif. 488. 1925.

Stems many, spreading or decumbent, 5–20 cm. long, branched, silky-villous. Basal leaves numerous, digitately 5-foliolate; leaflets equally silky on both surfaces, cuneate to obovate, 1–2.5 cm. long, crenate at the rounded summit; flowers many; sepals ovate, 2–3 mm. long, a little longer than the oblong bractlets, inflexed in fruit.

Mountain valleys and meadows, Canadian Zone; southern Sierra Nevada, California, to northern Lower California. Type locality: Sierra Nevada, about the headwaters of Kern River. June–Aug.

17. *Potentilla uniflora* Ledeb. Single-flowered Cinquefoil. Fig. 2431.

Potentilla uniflora Ledeb. Mém. Acad. St.-Petersb. 5: 543. 1812.

Potentilla macrantha var. *uniflora* G. Don, Gen. Hist. Pl. 2: 550. 1832.

Potentilla villosa var. *uniflora* Ledeb. Fl. Ross. 2: 58. 1844.

Potentilla nivea var. *uniflora* Rydb. Bull. Torrey Club 23: 303. 1896.

Stems arising from a densely caespitose caudex, about 5 cm. high, slightly villous or tomentose, with a few small leaves or nearly scapose, 1–2-flowered. Basal leaves crowded, ternate, silky or glabrate above, densely white-tomentose beneath; leaflets broadly cuneate, 10–15 mm. long, deeply cut from the apex into coarse oblong-lanceolate teeth; hypanthium about 8 mm. broad, villous or tomentose; sepals ovate-lanceolate, acute, 4–5 mm. long; bractlets a little narrower and shorter; petals 6–8 mm. long; stamens 20.

Arctic-Alpine Zone; eastern Asia and in North America from Alaska to Oregon and Colorado. Type locality: Davuria, southeastern Siberia. July–Aug.

18. *Potentilla villosa* Pall. Villous Cinquefoil. Fig. 2432.

Potentilla villosa Pall. ex. Pursh, Fl. Amer. Sept. 353. 1814.

Potentilla lucida Willd. ex Schlecht. Ges. Nat. Freunde Berlin Mag. 7: 296. 1815.

Potentilla fragiformis var. *villosa* Regel & Tiling, Fl. Ajan. 85. 1858.

Potentilla villosa var. *chrysocoma* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 88. 1898.

Stems several from the stout short caudex, 1–3 dm. high, villous with white or yellowish hairs. Basal leaves stout-petioled, ternate, prominently veined and densely white-tomentose beneath, densely silky above; leaflets 2–4 cm. long, obovate, coarsely toothed; cymes few-flowered; sepals 5–8 mm. long, triangular-ovate, bractlets ovate to oval, about equaling the lobes; petals yellow, 6–12 mm. long; stamens about 20.

Arctic-Alpine Zone; Alaska to the Olympic Mountains and Mount Rainier, Washington; also eastern Siberia. Type locality: northwest coast. July–Aug.

19. *Potentilla flabellifolia* Hook. Mount Rainier Cinquefoil. Fig. 2433.

Potentilla flabellifolia Hook. ex Torr. & Gray, Fl. N. Amer. 1: 442. 1840.

Potentilla gelida S. Wats. Proc. Amer. Acad. 8: 559. 1873. Not C. A. Mey. 1831.

Stems from a scaly branching rootstock, slender, 15–30 cm. high, minutely puberulent. Basal leaves usually with long slender petioles, ternate, very thin, short-pubescent or glabrate; leaflets cuneate-flabelliform, deeply incised-serrate; cymes few-flowered; sepals ovate, acute, 5–6 mm. long; bractlets oval, obtuse, about equaling the lobes; petals yellow, 8–10 mm. long.

Arctic-Alpine Zone; British Columbia to the central Sierra Nevada, California. Type locality: Mount Rainier, Washington. June–Sept.

20. *Potentilla saxosa* Lemmon. Rock Cinquefoil. Fig. 2434.

Potentilla saxosa Lemmon ex Greene, Pittonia 1: 171. 1888.

Horkelia saxosa Rydb. Mem. Dept. Bot. Columbia Univ. 2: 155. 1898.

Potentilla rosulata Rydb. Bull. Torrey Club 26: 542. 1899.

Potentilla acuminata Hall, Univ. Calif. Pub. Bot. 1: 86. 1902.

Stems slender from a branching caudex, 10–30 cm. high, villous-pubescent and glandular. Basal leaves pinnate, villous and glandular; leaflets 5–15, flabelliform, 10–15 mm. long, cleft to the middle into oblong-acutish or rounded segments; cyme few-flowered; sepals ovate, acute or short-acuminate, 3 mm. long, a third longer than the ovate or elliptical bractlets; petals yellow, spatulate-oblongate, acutish, 2–3 mm. long; stamens 20–40; styles filiform, attached below the apex of the achene.

Rock crevices, Upper and Lower Sonoran Zone; White Mountains and San Jacinto Mountains, California, to the San Rafael Mountains, Lower California. Type locality: San Rafael Mountains, Lower California. April–June.

21. *Potentilla diversifolia* Lehm. Diverse-leaved Cinquefoil. Fig. 2435.

Potentilla diversifolia Lehm. Stirp. Pug. 2: 9. 1830.

Potentilla dissecta Nutt. Journ. Acad. Phila. 7: 21. 1834. Not Pursh, 1814.

Potentilla glaucophylla Lehm. Ind. Sem. Hamb. 1836: 7. 1836.

Stems slender, erect, 1–3 dm. high, few-leaved, glabrous or strigose. Basal leaves digitate or often pinnate with approximate leaflets, sometimes both kinds on the same plant; leaflets 5–7, cuneate-oblongate to obovate, more or less deeply toothed or lobed with triangular-lanceolate

divisions, loosely villous-pubescent; sepals lanceolate, acute, 4–5 mm. long, a little exceeding the similar bractlets; petals well exceeding the sepals.

Usually in moist rocky situations, Canadian Zone; British Columbia and Saskatchewan to the Sierra Nevada, California, and Colorado. Type locality: summits of Rocky Mountains [British America] according to Hooker's Flora. June–Aug.

22. *Potentilla brevifolia* Nutt. Short-leaved Cinquefoil. Fig. 2436.

Potentilla brevifolia Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 442. 1840.

Stems from a short caespitose caudex, very short, usually less than 1 cm. high, glandular-puberulent. Basal leaves numerous, small with 1 or 2 pairs of leaflets, puberulent; leaflets sub-orbicular, cuneate at base, 5–10 mm. long, cleft and crenate; stem leaves 1 or 2, much reduced; hypanthium 4–5 mm. broad, glandular-puberulent; sepals broadly ovate, 4 mm. long, exceeding the oblong bractlets; petals slightly exceeding the sepals.

Moist slopes, Arctic-Alpine Zone: Blue Mountains, Oregon, to Idaho and Wyoming. Type locality: "Goodier River of the Oregon." Probably Goodwin, Idaho. July–Aug.

23. *Potentilla Grayi* S. Wats. Gray's Cinquefoil. Fig. 2437.

Potentilla Grayi S. Wats. Proc. Amer. Acad. 8: 560. 1873.

Potentilla Clarkiana Kell. Proc. Calif. Acad. 7: 94. 1876.

Stems subscapose from a short caudex, 5–15 cm. high, sparsely strigose or glabrous. Basal leaves pinnately 3-foliolate, with the middle leaflets long-petiolulate, glaucous-green, sparingly pubescent or glabrate; leaflets 1–2 cm. long, broadly obovate, coarsely 5–8-toothed; flowers on slender pedicels; sepals about 5 mm. long, about twice the length of the bractlets; petals slightly longer than the sepals.

Mountain meadows, Canadian and Hudsonian Zones; central and southern Sierra Nevada, California. Type locality: Yosemite. June–Aug.

24. *Potentilla Breweri* S. Wats. Brewer's Cinquefoil. Fig. 2438.

Potentilla Breweri S. Wats. Proc. Amer. Acad. 8: 555. 1873.

Potentilla Breweri var. *expansa* S. Wats. Bot. Calif. 1: 179. 1876.

Potentilla plattensis var. *leucophylla* Greene, Erythraea 1: 5. 1893.

Potentilla Bruceae Rydb. N. Amer. Fl. 22: 342. 1908.

Potentilla Breweri var. *viridia* Jepson, Man. Fl. Pl. Calif. 488. 1925.

Stems several from a short caudex, ascending or decumbent, 10–35 cm. high, tomentose. Basal leaves short-petioled, pinnate, densely white-silky-villous; leaflets 3–6 pairs, crowded, 7–15 mm. long, cuneate, deeply cut-toothed with lanceolate divisions; stem leaves similar but with few leaflets; inflorescence dense or rather open; hypanthium silky-villous, sepals acute or acuminate, 4–5 mm. long; bractlets narrowly lanceolate, shorter than the lobes; petals obcordate, exceeding the sepals.

Mountain meadows, Canadian Zone; Lane County, Oregon, south to the southern Sierra Nevada, California. Type locality: Mono Pass, California. June–Sept.

25. *Potentilla klamathensis* Rydb. Klamath Cinquefoil. Fig. 2439.

Potentilla klamathensis Rydb. N. Amer. Fl. 22: 343. 1908.

Potentilla plattensis var. *klamathensis* Jepson, Man. Fl. Pl. Calif. 488. 1925.

Stems diffuse or ascending from a short caudex, slender, 1–2 dm. high, sparingly and loosely villous with at first ascending but soon spreading hairs. Basal leaves nearly equaling the stems, with 6–10 pairs of leaflets, loosely hairy; leaflets 1–2 cm. long, dissected into linear-acute segments; pedicels recurved in fruit, 1–2 cm. long; sepals linear-lanceolate, acute, 6–7 mm. long; bractlets 5 mm. long in fruit, linear-oblong; petals slightly exceeding the sepals, obcordate.

Low moist alkaline flats, Arid Transition Zone; Klamath and Lake Counties, Oregon, and Modoc County, California. Type locality: near Fort Klamath, Oregon. May–July.

26. *Potentilla millefolia* Rydb. Many-leaved Cinquefoil. Fig. 2440.

Potentilla plattensis Greene, Fl. Fran. 1: 64. 1891. Not Nutt. 1840.

Potentilla millefolia Rydb. Bull. Torrey Club 23: 433. 1896.

Potentilla plattensis var. *millefolia* Jepson, Man. Fl. Pl. Calif. 488. 1925.

Stems numerous, prostrate or spreading from a short caudex, about 1 dm. long, appressed-pubescent. Basal leaves about as long as the stems, pinnate, sparingly strigose; leaflets 6–12 pairs, divided nearly to the base into linear-subulate divisions; flowers on slender pedicels, often reflexed in fruit; sepals lanceolate, about 5 mm. long; bractlets similar but a little smaller; petals obcordate, longer than the sepals.

Mountain meadows, Canadian Zone; Siskiyou County to Sierra County, California. Type locality: collected by Lemmon (No. 86), probably in Sierra County. June–July.

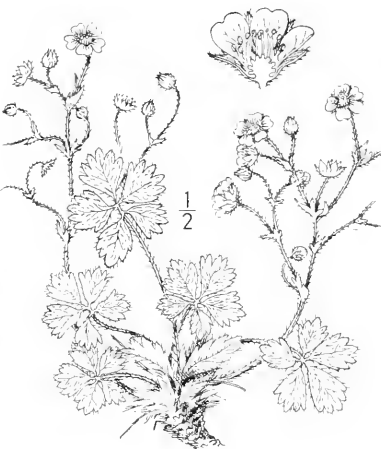
27. *Potentilla Hickmanii* Eastw. Hickman's Cinquefoil. Fig. 2441.

Potentilla Hickmanii Eastw. Bull. Torrey Club 29: 77. 1902.

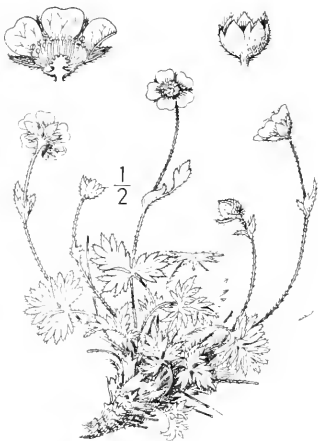
Stems slender, decumbent from a short woody taproot, 8–15 cm. long, sparingly strigose. Basal leaves pinnate, with usually 6 pairs of leaflets, sparingly strigose; leaflets 6–15 mm. long, digitately cleft to about the middle into 3–6 lanceolate divisions; pedicels slender, reflexed in



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2430



2431



2432



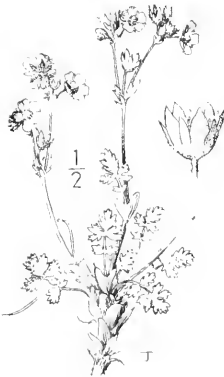
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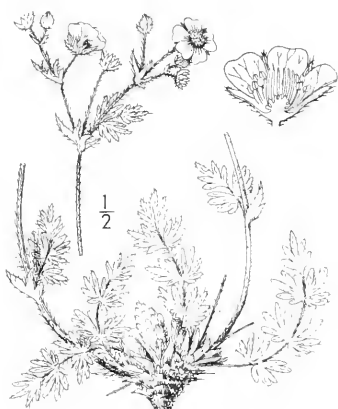


2437

2429. *Potentilla fastigiata*
2430. *Potentilla Wheeleri*
2431. *Potentilla uniflora*

2432. *Potentilla villosa*
2433. *Potentilla flabellifolia*
2434. *Potentilla saxosa*

2435. *Potentilla diversifolia*
2436. *Potentilla brevifolia*
2437. *Potentilla Grayi*



2438



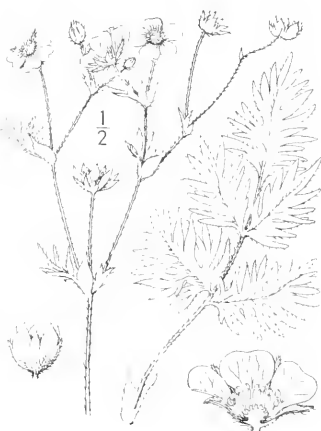
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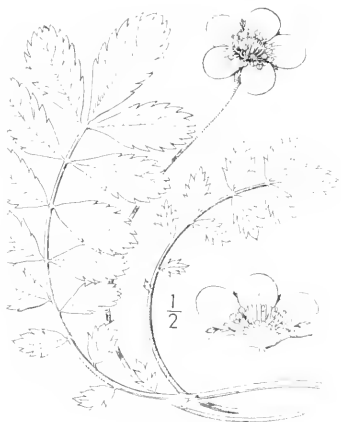
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2438. *Potentilla Brewerii*2439. *Potentilla klamathensis*2440. *Potentilla millefolia*2441. *Potentilla Hickmanii*2442. *Potentilla Drummondii*2443. *Potentilla multijuga*2444. *Potentilla fruticosa*2445. *Potentilla Anserina*2446. *Potentilla pacifica*

fruit; sepals lanceolate, acute, about 5 mm. long; bractlets oblong, obtuse, about half as long as the lobes; petals obcordate, exceeding the sepals.

Open pine forests, Transition Zone; Monterey Peninsula, California. Type locality: near the reservoir of Pacific Grove, California. April-Aug.

Potentilla versicolor Rydb. N. Amer. Fl. 22: 344. 1908. Stems decumbent or ascending from a thick caudex, 2 dm. high, sparingly appressed-silky. Basal leaves pinnate, 5-10 cm. long, tomentose when young, greener in age; leaflets 15-25, 5-8 mm. long, cuneate or flabelliform, divided to near the base into 3-7 linear-oblong acutish segments; flowers in an open 3-6-flowered cyme; sepals lanceolate, acute, 5 mm. long, a third longer than the elliptical or oval bractlets, hirsute; petals obcordate, 5 mm. long. The status of this species is doubtful, for it is known only from a single collection, Grayhart Buttes, Oregon, Coville & Leiberg 307.

28. *Potentilla Drummondii* Lehm. Drummond's Cinquefoil. Fig. 2442.

Potentilla Drummondii Lehm. Stirp. Pug. 2: 9. 1830.

Potentilla dissecta var. *Drummondii* Kurtz, Bot. Jahrb. 19: 374. 1894.

Potentilla Drummondii var. *cascadensis* (Rydb.) Th. Wolf, Bibl. Bot. 16, Heft 71: 492. 1908.

Potentilla anomalaefolia M. E. Peck, Proc. Biol. Soc. Wash. 49: 110. 1936.

Stems erect from a short caudex, 3-6 dm. high, slightly hirsute. Basal leaves sparsely hirsute, 5-10 cm. long; leaflets 2-5 cm. long, obovate-cuneate, deeply incised with linear-oblong or lanceolate, acute teeth; flowers long-pedicelled; sepals ovate-lanceolate, acuminate, longer than the lanceolate bractlets; petals obcordate, 6-10 mm. long.

Boreal Zones; British Columbia to Alberta and southern Sierra Nevada, California. Type locality: "Rocky Mountains north of Smoking River in latitude 56°." May-Aug.

29. *Potentilla multijuga* Lehm. Coast Cinquefoil. Fig. 2443.

Potentilla multijuga Lehm. Ind. Sem. Hamb. 1849: 6. 1849.

Stems erect, 3-7 dm. high from a stout taproot, sparsely strigose, more or less leafy. Basal leaves numerous, pinnate, 20-30 cm. long, slightly hairy or glabrate; leaflets usually 13-27, obovate-cuneate, 1-4 cm. long, coarsely toothed above the middle; pedicels slender, 2-4 cm. long; sepals ovate, acute, 5-6 mm. long, a third longer than the oblong bractlets; petals obcordate, about a third longer than the sepals.

A little known species, occurring in low coastal flats near Playa del Rey, Los Angeles County, California. Type locality: California. June-Aug.

30. *Potentilla fruticosa* L. Shrubby Cinquefoil. Fig. 2444.

Potentilla fruticosa L. Sp. Pl. 495. 1753.

Dasiphora riparia Raf. Aut. Bot. 167. 1838.

Dasiphora fruticosa Rydb. Mem. Dept. Bot. Columbia Univ. 2: 188. 1898.

Much branched shrub, with very leafy erect or ascending stems, 2-12 dm. high, the bark shreddy. Leaflets 3-7, linear to oblong, entire, acute at each end, 0.5-2 cm. long, silky-pubescent, the margins revolute; flowers in small loose cymes or solitary; bractlets linear-oblong, usually a little longer than the ovate, acuminate sepals; petals yellow, orbicular, 5-15 mm. long.

Open meadows or moist rocky slopes, Boreal Zones; Alaska to Labrador, California, New Mexico, and New Jersey; also in Europe and Asia. Type locality: England. June-Aug.

31. *Potentilla Anserina* L. Common Silver-weed. Fig. 2445.

Potentilla Anserina L. Sp. Pl. 495. 1753.

Potentilla argentina Huds. Fl. Angl. 195. 1762.

Fragaria Anserina Crantz, Stirp. Aust. 2: 9. 1763.

Argentina vulgaris Lam. Fl. Franc. 3: 119. 1778.

Argentina Anserina Rydb. Mem. Dept. Bot. Columbia Univ. 2: 159. 1898.

Basal leaves 1-2 dm. long, with about 9-31 larger leaflets interspersed with smaller; petioles and rachis long-hairy; larger leaflets 1-4 cm. long, oblong or oblong-lanceolate, white-silky and tomentose beneath, green and sparsely silky above; pedicels 3-10 cm. long; sepals broadly ovate; petals oval, 7-10 mm. long; achenes corky, grooved at the upper end.

Native of Europe and Asia and in North America, Manitoba to New Mexico, southern California, and Alaska. Type locality: in Europe. The plants of Western America differ from the European and the apparently introduced plants of eastern North America by the more obovate leaflets rounded at the apex and the broader ovate or triangular teeth. April-Oct.

Potentilla Anserina var. *sericea* Hayne, Arzn. Gew. 4: 31. 1816. (*P. Anserina* var. *argentea* (Rydb.) Jepson, Man. Fl. Pl. Calif. 485. 1925.) Upper surface of leaflets silvery-sericeous. Probably not more than an ecological form, associated with drier habitats, away from the coast, Oregon to California and across the continent, also in Europe.

32. *Potentilla pacifica* Howell. Pacific Silver-weed. Fig. 2446.

Potentilla Anserina var. *grandis* Torr. & Gray, Fl. N. Amer. 1: 444. 1840.

Potentilla pacifica Howell, Fl. N.W. Amer. 1: 179. 1898.

Argentina Anserina var. *grandis* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 161. 1898.

Argentina pacifica Rydb. N. Amer. Fl. 22: 353. 1908.

Argentina grandis Piper in Piper & Beattie, Fl. Northw. Coast 211. 1915.

Argentina occidentalis Rydb. N. Amer. Fl. 22: 354. 1908.

Basal leaves mostly erect, 2-4 dm. long, the petioles and rachis mostly with appressed pubescence or almost glabrous; larger leaflets 15-25, obovate or oval, the upper 4-6 cm. long, coarsely serrate, glabrous or nearly so above, white-silky and tomentose beneath; peduncles 1-2 dm. long; hypanthium silky; bractlets lanceolate, 6-8 mm. long; sepals ovate, 5-6 mm. long; petals broadly obovate, 10-12 mm. long; achenes neither grooved nor corky.

Moist ground near the coast, Alaska to southern California. Type locality: Oregon. April-Aug.

33. *Potentilla palustris* L. Purple or Marsh Cinquefoil. Fig. 2447.*Comarum palustre* L. Sp. Pl. 502. 1753.*Potentilla palustris* Scop. Fl. Carn. ed. 2. 1: 359. 1772.

Stems stout, ascending, 2–5 dm. high, the upper part pubescent and more or less glandular. Leaves 5–7-foliolate, the lower long-petioled; leaflets 2–6 cm. long, oblong or oval, sharply serrate, obtuse or acute, stipules membranaceous; sepals ovate, acuminate, 10–15 mm. long, wine-purple within; petals very much smaller than the sepals, ovate-lanceolate.

Swamps and peat bogs, Boreal Zones; Alaska to Labrador, northern California, Wyoming, Iowa, and New Jersey, also Europe and Asia. Type locality: Europe. May–Aug.

34. *Potentilla Convallaria* Rydb. Convallaria Cinquefoil. Fig. 2448.*Potentilla Convallaria* Rydb. Bull. Torrey Club 24: 249. 1898.*Drymocallis Convallaria* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 193. 1898.*Drymocallis corymbosa* Rydb. N. Amer. Fl. 22: 369. 1908.*Potentilla arguta* var. *Convallaria* Tb. Wolf, Bibl. Bot. 16, Heft 71: 134. 1908.

Stems 3–10 dm. high, more or less glandular-villous. Basal leaves with 7–11 leaflets; petioles 2–10 cm. long, viscid-villous; leaflets 3–5 cm. long, the upper obovate, the lower more orbicular and smaller, coarsely doubly serrate; cyme many-flowered, rather narrow and compact or more or less flat-topped; bractlets linear-lanceolate, 4–5 mm. long; sepals ovate-lanceolate, acute, 5 mm. long, becoming 8 mm. long in fruit; petals cream-white, 5–6 mm. long.

Mountain meadows, Boreal Zones; British Columbia and Athabasca to Washington, Colorado, and New Mexico. Type locality: near Bozeman, Montana.

35. *Potentilla Hansenii* Greene. Hansen's Cinquefoil. Fig. 2449.*Potentilla glandulosa* var. *nevadensis* S. Wats. Bot. Calif. 1: 178. 1876.*Potentilla glandulosa* var. *lactea* Greene, Fl. Fran. 65. 1891.*Potentilla Hansenii* Greene, Pittonia 3: 20. 1896.*Potentilla lactea* Greene, Pittonia 3: 20. 1896.*Drymocallis Hansenii* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 200. 1898.*Drymocallis cuneifolia* Rydb. op. cit. 2: 204.*Potentilla Piersonii* Munz, Bull. S. Calif. Acad. 31: 65. 1932.

Stems slender, 3–6 dm. high, finely pilose, only slightly viscid. Basal leaves with about 9 leaflets; petioles 2–5 cm. long, pilose; leaflets sparingly pubescent on the veins and only slightly glandular, the upper obovate, 15–30 mm. long, the lower smaller and much rounded, stem leaves reduced; hypanthium pilose; sepals lanceolate, acute, 4 mm. long, becoming 6 mm. long in fruit; bractlets lanceolate, 2–3 mm. long; petals cream-colored, obovate, about 5 mm. long.

Mountain meadows, Transition and Canadian Zones; Sierra Nevada and San Bernardino Mountains, California. Type locality: Fresno and Kern Counties, California. June–Aug.

36. *Potentilla ashlandica* Greene. Ashland Cinquefoil. Fig. 2450.*Potentilla ciliata* Howell, Fl. N.W. Amer. 1: 175. 1898. Not Greene, 1887.*Potentilla ashlandica* Greene, Pittonia 3: 248. 1898.*Drymocallis ashlandica* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 200. 1898.*Drymocallis monticola* Rydb. N. Amer. Fl. 22: 370. 1908.*Drymocallis gracilis* Rydb. Bull. Torrey Club 28: 177. 1901.

Stems 2–3 dm. high, slender, arising from creeping rootstocks, simple below, branched above with ascending or erect branches, only slightly glandular, finely pilose above. Leaflets of basal leaves 5–9, obovate, 10–25 mm. long, coarsely and doubly serrate; stem leaves few, smaller 3–5-foliolate; cymes narrow; hypanthium densely pilose, usually half the length of the sepals; petals cream-yellow, orbicular, 8–10 mm. long, well exceeding the sepals; styles glandular.

Mountain streams and meadows, mainly Canadian Zone; southern Cascade and Siskiyou Mountains, Oregon, to the southern Sierra Nevada, California. Type locality: Ashland Butte, Oregon. June–July.

37. *Potentilla pumila* (Rydb.) Fedde. Dwarf Cinquefoil. Fig. 2451.*Drymocallis pumila* Rydb. N. Amer. Fl. 22: 372. 1908.*Potentilla pumila* Fedde, Bot. Jahresb. 36: 494. 1910.*Potentilla glandulosa* var. *pumila* Jepson, Fl. Calif. 2: 181. 1936.

Cespitose, the stems 10–20 cm. high, sparingly viscid-puberulent. Leaflets of the basal leaves 9–11, glandular-puberulent or glabrate, the terminal broadly obovate, about 1 cm. long, serrate with ovate teeth, the lateral leaflets often broader than long; stem leaves 1–3, the upper often only 3-foliolate; inflorescences corymbose, few-flowered; bractlets elliptic to oblong-lanceolate, acute, a little shorter than the ovate sepals; petals orbicular or nearly so, 7–8 mm. long, yellow.

Moist places, Upper Sonoran and Arid Transition Zones; southeastern Oregon to northeastern California, Nevada, and Utah. Type locality: Moist cliffs, Steens Mountain, Oregon. June–July.

38. *Potentilla glandulosa* Lindl. Sticky Cinquefoil. Fig. 2452.*Potentilla glandulosa* Lindl. Bot. Reg. 19: pl. 1583. 1838.*Potentilla arguta* var. *glandulosa* Cockerell, W. Amer. Sci. 5: 11. 1888.*Drymocallis glandulosa* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 198. 1898.*Drymocallis amplifolia* Rydb. N. Amer. Fl. 22: 373. 1908.

Stems strict, slender, 3–6 dm. high, viscid and glandular-hirsute, branching above. Basal leaves with 7–9 leaflets, nearly glabrous above, sparingly glandular-hirsute beneath; leaflets

obovate, simply or doubly serrate, 1–3 cm. long; stem leaves reduced; flowers in an open many-flowered cyme; hypanthium glandular-hirsute; sepals ovate-lanceolate, acute or acuminate, 6–7 mm. long, becoming 10 cm. long in fruit; bractlets linear-lanceolate, 4–5 mm. long; petals obovate, yellow, about equaling the sepals.

Open woods and hillsides, Upper Sonoran and Transition Zones; British Columbia to eastern Oregon, South Dakota, and New Mexico. Type locality: California. Described from cultivated plants, grown from seeds collected by Douglas, probably in the Columbia Basin. May–July.

Potentilla vâlda Greene, Pittonia 3: 20. 1896. Stems stout, leafy, 4–10 dm. high, more or less glandular-villous, branched above. Basal leaves with 7–11 leaflets, more or less pubescent or glabrate, glandular-tomiferous; leaflets 3–6 cm. long, the terminal broadly obovate, the lateral nearly orbicular or obliquely elliptical; stem leaves similar; cyme open, rather flat-topped in fruit; hypanthium viscid-villous; sepals ovate-lanceolate, acute, 6 mm. long, becoming 10 cm. long in fruit; bractlets lanceolate, about 4 mm. long; petals yellow, nearly orbicular, 8–10 mm. long. Meadows, Transition Zone; British Columbia and Idaho to Oregon and northern Utah. Type locality: Victoria, Vancouver Island, British Columbia. Possibly only a large-flowered form of *Potentilla glandulosa* Lindl.

39. *Potentilla Wrangelliâna* Fisch. & Avé-Lall. Wrangell's Cinquefoil. Fig. 2453.

Potentilla Wrangelliana Fisch. & Avé-Lall. Ind. Sem. Hort. Petrop. 7: 140. 1840.

Drymocallis Wrangelliana Rydb. Mem. Dept. Bot. Columbia Univ. 2: 201. 1898.

Potentilla glandulosa var. *Wrangelliana* Th. Wolf, Bibl. Bot. 16: Heft 71: 137. 1908.

Drymocallis oregana Rydb. N. Amer. Fl. 22: 374. 1908.

Stem stout, 4–8 dm. high, leafy, branched, densely glandular-villous. Basal leaves with 7–9 leaflets, sparingly pubescent on both surfaces; leaflets often 5–6 cm. long, obovate or nearly orbicular; stem leaves with few leaflets, these little reduced in size; cyme open, usually dichotomously branching; sepals ovate, abruptly obtuse or rounded with mucronate tip, 5–6 mm. long, becoming 8–10 mm. long in fruit; petals ochroleucous, broadly oval, about the length of the sepals.

Open woods and hillsides, Upper Sonoran and Transition Zones; British Columbia and Idaho to southern California. Type locality: near Fort Ross, California. April–July.

Drymocallis âlbida Rydb. N. Amer. Fl. 22: 375. 1908. Stems viscid-villous. Basal leaves with usually 7 leaflets, sparingly pubescent; leaflets 2–4 cm. long, the terminal obovate, the lateral more rounded; bractlets linear-lanceolate, about 2 mm. long; sepals elliptic-ovate, mucronate, 4–5 mm. long, in fruit 7–8 mm. long; petals obovate, whitish, usually shorter than the sepals. In moist shady places, British Columbia to Washington. Doubtfully distinct from *Potentilla Wrangelliana*.

40. *Potentilla refléxa* Greene. Greene's Cinquefoil. Fig. 2454.

Potentilla glandulosa var. *reflexa* Greene, Fl. Fran. 1: 65. 1891.

Potentilla reflexa Greene, Pittonia 3: 19. 1896.

Drymocallis reflexa Rydb. Mem. Dept. Bot. Columbia Univ. 2: 203. 1898.

Drymocallis laxiflora Rydb. N. Amer. Fl. 22: 374. 1908.

Stem 3–6 dm. high, villous and only slightly glandular. Basal leaves with about 7 leaflets, rather densely pubescent; leaflets coarsely serrate with ovate teeth, the terminal rhombic, 2–3 cm. long, the lateral smaller and more obovate; cyme few-flowered, rather open; bractlets lanceolate, much shorter than the ovate mucronate sepals; petals deep yellow, broadly obovate, about equaling the sepals, reflexed in anthesis.

Dry hillsides, Upper Sonoran Zone; foothills of the Sierra Nevada and southern California mountains. Type locality: foothills, Sierra Nevada, California. April–June.

41. *Potentilla rhomboidea* Rydb. Rhomboid Cinquefoil. Fig. 2455.

Potentilla rhomboidea Rydb. Bull. Torrey Club 23: 248. 1896.

Drymocallis rhomboidea Rydb. Mem. Dept. Bot. Columbia Univ. 2: 203. 1898.

Stems slender, about 2 dm. high, simple, nearly glabrous or glandular-pubescent above. Basal leaves short-petioled; leaflets about 7, rhombic-ovate, the largest 1.5 cm. long, mostly acute, serrate with acute teeth, glabrous or sparsely pubescent; stem leaves about 3, the lowest similar, the others 3-foliate and subsessile; cymes open, few-flowered; bractlets linear-oblong, obtuse, 2–3 mm. long; sepals broadly ovate, 4–5 mm. long; petals yellow, obovate, a little longer than the sepals; styles nearly basal, filiform, in fruit about twice as long as the smooth achene.

Mountain meadows, Transition Zone; Washington and western Montana to southwestern Oregon. Type locality: Deer Creek Mountains, Josephine County, Oregon. May–July.

13. *DUCHÉSNEA* J. E. Smith, Trans. Linn. Soc. 10: 372. 1811.

Perennial herbs, with trailing stems (runners) often rooting at the nodes, 3-foliate, long-petioled leaves, and axillary yellow flowers on slender peduncles. Sepals, bractlets, and petals 5. Stamens numerous. Pistils numerous. Receptacle hemispherical, greatly enlarged in fruit, but not pulpy. Achenes superficial. [Named in honor of A. N. Duchesne, French botanist.]

Two species, natives of southern Asia. Type species, *Duchesnea indica* (Andr.) Focke.

1. *Duchesnea ândica* (Andr.) Focke. Mock or Indian Strawberry. Fig. 2456.

Fragaria ândica Andr. Bot. Rep. pl. 479. 1807.

Duchesnea ândica Focke in Engler & Prantl, Nat. Pflanzenf. 3³: 33. 1888.

Stems trailing, forming leafy runners, silky-pubescent. Leaflets 2–4 cm. long, obovate or



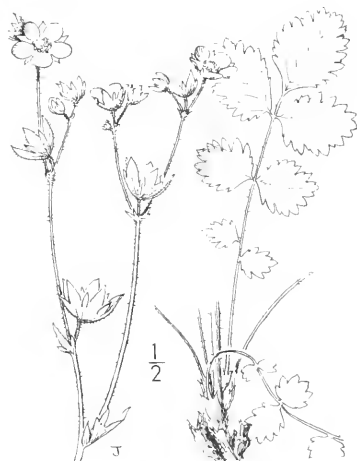
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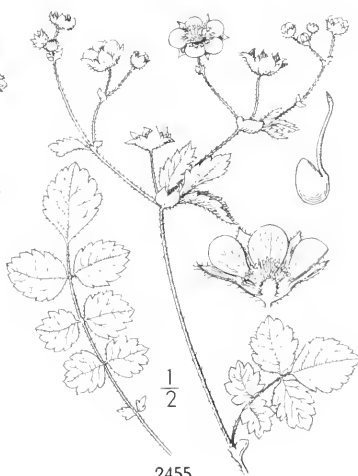
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2447. *Potentilla palustris*
 2448. *Potentilla Convallaria*
 2449. *Potentilla Hansenii*

2450. *Potentilla ashlandica*
 2451. *Potentilla pumila*
 2452. *Potentilla glandulosa*

2453. *Potentilla Wrangelliana*
 2454. *Potentilla reflexa*
 2455. *Potentilla rhomboidea*

broadly oval, crenate, glabrate and dark green above, silky-pubescent beneath, peduncles equaling or longer than the leaves; flowers 15–20 mm. broad; bractlets toothed, exceeding the ovate or lanceolate spreading sepals; fruit red, ovoid or globose, insipid.

Cultivated as an ornamental plant, and becoming naturalized on the Pacific Coast, but not frequent. Native of India. May–Aug.

14. *FRAGARIA* L. Sp. Pl. 494. 1753.

Perennial acaulescent stoloniferous herbs, with scaly rootstocks. Leaves ternate, rarely with one or two small bractlike ones in addition. Hypanthium very shallow, almost flat. Bractlets and sepals 5. Petals 5, white or in one species pink, broadly orbicular to elliptical. Stamens 20, in three series, closely surrounding the base of the receptacle. Receptacle hemispherical or conical bearing very numerous pistils, becoming enlarged, red and juicy in fruit. Styles filiform, rather short, attached near the middle of the ovaries. Achenes small, turgid and crustaceous; seeds ascending, amphitropous. [Name Latin, *fragum*, meaning fragrance.]

About 35 species, natives of the north temperate zone and the Andes of South America. Type species, *Fragaria vesca* L.

Leaves thick and coriaceous, more or less densely silky.

1. *F. chiloensis*.

Leaves rather thin, not coriaceous.

Leaves densely silky beneath.

2. *F. californica*.

Leaves slightly silky beneath, in age glabrate.

Leaflets subsessile; achenes superficial.

Flowers pinkish, nodding from the beginning.

3. *F. Helleri*.

Flowers white, erect or spreading, nodding only in fruit.

4. *F. bracteata*.

Leaflets usually petiolulate; achenes set in usually deep pits; plants more or less glaucous.

5. *F. platyptala*.

1. *Fragaria chiloensis* (L.) Duchesne. Chilean or Beach Strawberry. Fig. 2457.

Fragaria vesca var. *chiloensis* L. Sp. Pl. 495. 1753.

Fragaria chiloensis Duchesne, Hist. Nat. Fraiss. 165. 1766.

Fragaria chilensis Molina, Sagg. Chile 134. 1784.

Fragaria chilensis var. *Scouleri* S. Wats. Bibl. Index 282. 1878.

Rootstocks stout and thick, crowned with many leaves and large brown scarious stipules. Petioles stout, 2–20 cm. long, densely silky-villous with upwardly appressed or at length spreading hairs; leaflets thick and coriaceous, slightly pubescent above when young but glabrous and shiny in age, strongly nerved and reticulate, densely silky-pubescent and tomentulose beneath, the terminal one 2–5 cm. long, distinctly petiolulate, broadly obovate, rounded to subcordate at apex, crenate above the middle, the lateral similar but smaller and usually subsessile and very oblique; scapes densely silky, shorter than or exceeding the leaves; flowers 20–35 mm. broad; hypanthium and sepals densely silky; fruit hemispheric, 15–20 mm. in diameter, hairy; achenes set in shallow pits.

Mainly a maritime species; extending from Alaska to central California, and in South America from Peru to Patagonia; also in the Sandwich Islands. One of the parents of the commonly cultivated varieties and used in California as a ground cover for banks. Type locality: Concepción or possibly on Chiloe Island, Chile. March–Aug.

Fragaria cuneifolia Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 448. as synonym. 1840. Closely related to *F. chiloensis* and probably not specifically distinct. Leaflets firm but thinner and not reticulate, narrower and decidedly cuneate, pubescence of the petioles and peduncles more divaricately spreading and even reflexed, flowers somewhat smaller. Western British Columbia to western Oregon.

Fragaria crinita Rydb. Mem. Dept. Bot. Columbia Univ. 2: 171. 1898. Very similar to *F. chiloensis* and probably only a form. Leaflets not reticulate and rather sharply toothed; petioles and peduncles densely villous-hirsute with spreading hairs. British Columbia to northern California.

2. *Fragaria californica* Cham. & Sch. California Strawberry. Fig. 2458.

Fragaria californica Cham. & Sch. Linnaea 2: 20. 1827.

Fragaria californica var. *franciscana* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 173. 1898.

Rootstock short, not very thick. Leaves few with ovate-lanceolate, brown, scarious stipules; petioles slender, sparingly villous with long white spreading or reflexed hairs; terminal leaflets rounded obovate, 2–5 cm. long, obtuse, coarsely serrate, subsessile, glabrate above, appressed-villous beneath, the lateral very oblique; scapes slender, villous with spreading hairs, seldom leafy-bracted; flowers 10–15 mm. broad; hypanthium silky; silky bractlets and sepals lanceolate, acuminate or acute; petals very little exceeding the sepals, obovate; fruit hemispherical, 10–15 mm. in diameter; achenes in shallow pits.

Shaded banks and open woods, Transition and Upper Sonoran Zones; northern California to Lower California and New Mexico. Type locality: California. March–June.

3. *Fragaria Helleri* Holz. Heller's or Pink-flowered Strawberry. Fig. 2459.

Fragaria Helleri Holz. Bot. Gaz. 21: 36. 1896.

Rootstock rather slender. Leaves very thin, glabrate above, finely silky beneath; petioles and scapes very slender, sparingly silky or glabrate in age; leaflets broadly obovate, 20–30 mm. long, coarsely serrate; scapes 10–20 cm. high, often with a foliaceous unifoliate bract; flowers 15–20 mm. broad, on nodding pedicels; petals nearly orbicular, rose-colored; fruit oblong; achenes superficial.

Known only from a few localities: Olympia, Olga, and Orcus Island, Washington, and Latah County, Idaho. Type locality: Pine Creek, near Farmington Landing, Latah County, Idaho. May–June.

4. *Fragaria bracteata* Heller. Bracted Strawberry. Fig. 2460.

Fragaria bracteata Heller, Bull. Torrey Club 25: 194. 1896.

Fragaria retrorsa Greene, Ottawa Nat. 18: 216. 1905.

Rootstock short and rather thick. Leaves very thin, somewhat glaucous, silky when young, glabrate in age; petioles and scapes slender, villous with long spreading or reflexed hairs; leaflets broadly obovate, acute, coarsely serrate, 2–5 cm. long; scapes often 10 cm. long, often exceeding the leaves, usually with a unifoliate bract; flowers 15–20 mm. broad; sepals and bractlets lanceolate-acute; petals often nearly twice the length of the sepals; fruit ovoid; achenes superficial.

Open forests especially in clearings, Transition Zone; British Columbia and Montana to the eastern slope of the Sierra Nevada, California, and New Mexico. Type locality: Santa Fe Creek, nine miles east of Santa Fe, New Mexico. May–June.

5. *Fragaria platypetala* Rydb. Broad-petaled Strawberry. Fig. 2461.

Fragaria virginiana var. *illinoensis* S. Wats. Bot. Calif. 1: 177. 1876.

Fragaria platypetala Rydb. Mem. Dept. Bot. Columbia Univ. 2: 177. 1898.

Fragaria latiuscula Greene, Ottawa Nat. 18: 216. 1905.

Fragaria virginiana var. *platypetala* Hall, Univ. Calif. Pub. Bot. 4: 198. 1912.

Rootstock thick and woody. Leaves rather firm, glabrous and glaucous above, appressed-silky beneath; petioles and scapes rather stout, villous with long spreading or reflexed hairs; leaflets broadly cuneate to obovate, 2–8 cm. long, coarsely serrate or crenate above the middle, distinctly petiolulate; flowers 15–25 mm. broad; sepals and bractlets lanceolate; petals almost orbicular, usually twice as long as the sepals; fruit hemispheric, 10–15 mm. broad; achenes in rather shallow pits.

Open woods, mainly Transition Zone; Alaska to the Sierra Nevada, California, Montana, Wyoming, and Utah. Type locality: Spout, British Columbia. May–June.

Fragaria Suksdórfii Rydb. N. Amer. Fl. 22: 361. 1908. Leaflets short-petiolulate, elliptic-ob lanceolate, crenate above the middle with round-ovate teeth, densely silky beneath, becoming less so and glaucous in age; sepals ovate-acuminate; petals broadly oval, 8 mm. long; fruit subglobose, about 1 cm. in diameter; achenes in very shallow pits. Closely related to *F. platypetala* and perhaps not specifically distinct. Originally collected "on dry grounds in open woods, Falcon Valley, Washington."

Fragaria truncata Rydb. Mem. Dept. Bot. Columbia Univ. 2: 177. 1898. Closely related to *F. platypetala*, being distinguished chiefly by the elliptic sepals and bractlets. Originally collected in Nevada County, California.

Fragaria siboldifolia Rydb. Mem. Dept. Bot. Columbia Univ. 2: 176. 1898. This is probably a dwarf alpine form of *F. platypetala*, and has been so designated by Hall (Univ. Calif. Pub. Bot. 4: 199. 1912). Terminal leaflet broadly obovate, truncate, coarsely 3–7-toothed at the apex, 1–2 cm. long; achenes in deep pits. Boreal Zones of the southern Sierra Nevada.

15. *SIBBÁLDIA* L. Sp. Pl. 284. 1753.

Low, tufted perennial herbs, with short cespitose caudices, ternate leaves, and cymose flowers and scape-like peduncles. Hypanthium campanulate; sepals and bractlets 5. Petals 5, yellow. Stamens 5; filaments filiform, inclined. Pistils 5–20; styles lateral. Ovule attached near the base of the style, amphitropous. [Name in honor of Robert Sibbald, a Scotch botanist.]

About 5 species of the arctic and alpine regions of the northern hemisphere. Type species, *Sibbaldia procumbens* L.

1. *Sibbaldia procumbens* L. *Sibbaldia*. Fig. 2462.

Sibbaldia procumbens L. Sp. Pl. 284. 1753.

Potentilla procumbens Clairv. Man. 166. 1811. Not Sibth. 1794.

Potentilla Sibbaldii Hall. f. in Ser. Mus. Helv. 1: 51. 1818.

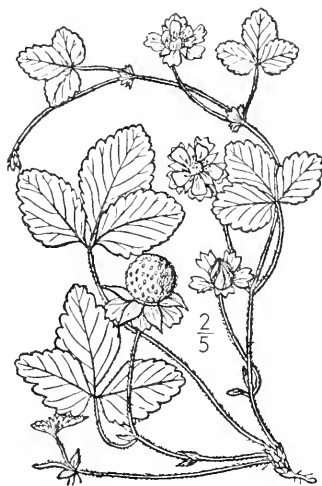
Densely tufted with short, decumbent or creeping, woody stems, and membranaceous stipules. Leaves 3-foliate, with slender petioles; leaflets obovate or oblanceolate, cuneate at the base, 3–5-toothed at the apex, sparsely pubescent on both surfaces; peduncles axillary, nearly leafless, about equaling the leaves; sepals oblong-ovate, acute, 2–3 mm. long, much longer than the narrow bractlets; petals yellow, oblong or oval, much shorter than the sepals.

Moist places, Arctic-Alpine and Hudsonian Zones; Alaska to Greenland, south to the southern Sierra Nevada and San Bernardino Mountains, California, Colorado, and New Hampshire; also in Europe and Asia. Type locality: Lapland. June–July.

16. *ALCHEMILLA* L. Sp. Pl. 123. 1753.

Annual or perennial herbs, with alternate leaves and connate stipules. Leaves palmately lobed or divided. Flowers usually cymose, but in ours in axillary few-flowered clusters. Hypanthium campanulate to urn-shaped, enclosing the achene in fruit. Sepals 4–5, usually with as many minute bractlets. Petals none. Stamens 1–4, the anthers opening by a transverse slit. Pistils 1–8, free from the hypanthium; styles nearly basal, persistent. [Name from its fancied value in alchemy.]

About 30 species, chiefly in the mountains from Mexico to Chile, with a few in Europe, Asia and South Africa. Type species, *Alchemilla vulgaris* L.



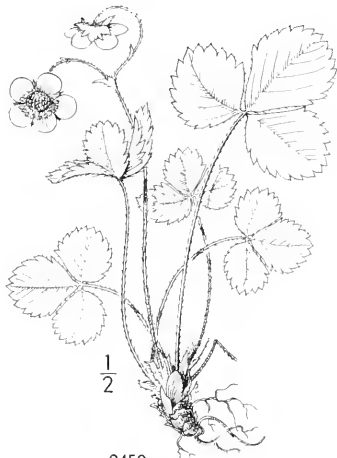
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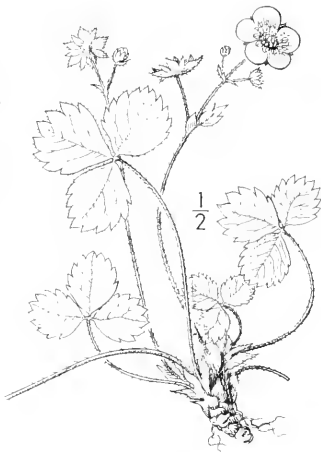
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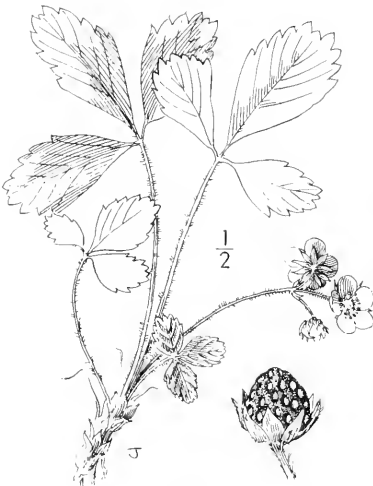
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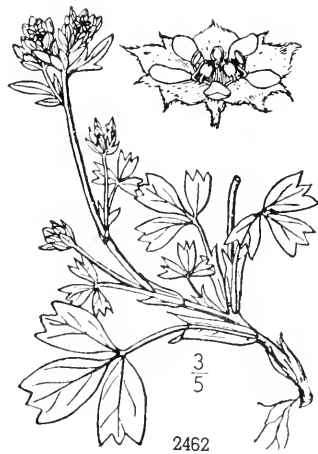
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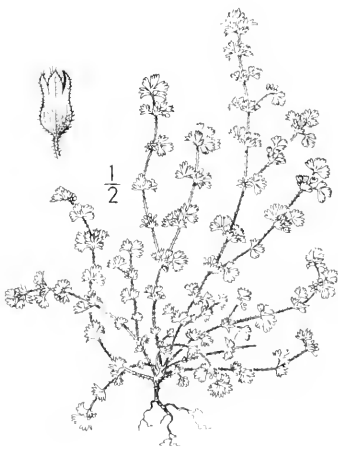
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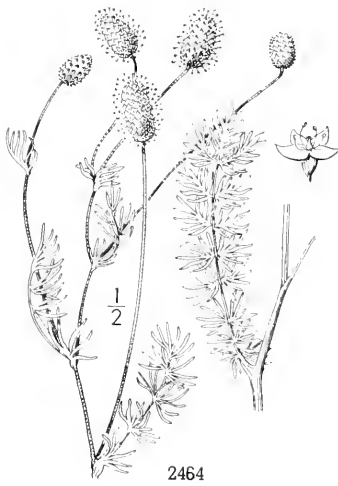
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2456. *Duchesnea indica*
 2457. *Fragaria chiloensis*
 2458. *Fragaria californica*

2459. *Fragaria helleri*
 2460. *Fragaria bracteata*
 2461. *Fragaria platypetala*

2462. *Sibbaldia procumbens*
 2463. *Alchemilla occidentalis*
 2464. *Sanguisorba occidentalis*

1. *Alchemilla occidentalis* Nutt. Western Lady's Mantle or Dew-cup. Fig. 2463.

Alchemilla occidentalis Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 432. 1840.

Alchemilla cuneifolia Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 432. 1840.

Alchemilla arvensis var. *occidentalis* Piper, Fl. Palouse Reg. 96. 1901.

Aphanes occidentalis Rydb. N. Amer. Fl. 22: 380. 1903.

Aphanes macrosepala Rydb. N. Amer. Fl. 22: 380. 1908.

Low profusely branched hirsute annual, 3–10 cm. high. Leaves petioled, cuneate-flabelliform, 5–8 mm. long, deeply 3-parted, the divisions again 3–5-cleft; hypanthium about 1 mm. long, urn-shaped, hirsute with rather short stiff hairs; bractlets usually present, ovate, about half as long as the ovate sepals; stamen 1; pistils 1 or 2; achene glabrous.

Open fields, Transition and Upper Sonoran Zones; Washington to Lower California. Type locality: rocky plains of Columbia River. March–June.

Alchemilla arvensis (L.) Scop. (Fl. Carn. ed. 2. 1: 115. 1770) to which the Pacific Coast plants have been referred is a native of the Old World and sparingly introduced in eastern North America.

17. *SANGUISÓRBA* L. Sp. Pl. 116. 1753.

Annual or perennial herbs. Leaves alternate, odd-pinnate, with adnate stipules and toothed or petiolifid leaflets. Flowers small, perfect or some of them pistillate, in dense terminal spikes. Hypanthium urn-shaped, angled and usually winged. Sepals 4. Petals none. Stamens 2–4 or in some exotic species many. Pistil one, free from the hypanthium; style terminal; ovule solitary. Achene enclosed in the indurate 4-angled or winged hypanthium. [Name Latin, meaning blood-staunching, from its supposed properties.]

About 10 species, natives of the north temperate zone. Type species, *Sanguisorba officinalis* L.

Annual or biennial; flowers greenish, leaves pinnatifid.

1. *S. occidentalis*.

Perennial; leaves toothed.

Flowers white.

2. *S. sitchensis*.

Flowers purple.

3. *S. microcephala*.

1. *Sanguisorba occidentalis* Nutt. Western Great Burnet. Fig. 2464.

Sanguisorba occidentalis Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 429. 1840.

Sanguisorba myriophylla Braun & Bouché, Ind. Sem. Hort. Berl. App. 1867: 10. 1868.

Poteridium occidentale Rydb. N. Amer. Fl. 22: 388. 1908.

Glabrous annual or biennial herb, with a taproot, the stems branching, leafy, 1–4 dm. high. Leaves odd-pinnate; stipules foliaceous, pectinately divided; leaflets of the lower leaves 11–15, obovate in outline, 1–2 cm. long, pectinately pinnatifid into narrowly linear segments; spikes globose to oblong-cylindrical, 5–25 mm. long, or more elongated in fruit; flowers hermaphrodite; bracts and bractlets with broad scarious margins; sepals oval, green with whitish margins, 2 mm. long; stamens usually 2; fruiting hypanthium 4-angled with narrow thick wings.

Grassy slopes, Arid Transition Zone; southern British Columbia and western Montana to southern California. Type locality: The Cascades, Columbia River. May–July.

2. *Sanguisorba sitchensis* C. A. Mey. Sitka Great Burnet. Fig. 2465.

Sanguisorba canadensis var. *latifolia* Hook. Fl. Bor. Amer. 1: 198. 1832.

Sanguisorba sitchensis C. A. Mey. Fl. Ochot. 34. 1856.

Poterium sitchense S. Wats. Bibl. Index 1: 303. 1878.

Sanguisorba latifolia Coville, Contr. U.S. Nat. Herb. 3: 339. 1896.

Glabrous perennial from a stout rootstock, the stems leafy, simple or branched above, 2–12 dm. high. Leaves odd-pinnate, 1–10 dm. long, the lower with 11–21 leaflets; stipules rounded, coarsely toothed; leaflets oblong-ovate, 2–7 cm. long, rounded at the apex, cordate at the base, coarsely serrate, petiolulate; spike 2–10 cm. long, lanceolate becoming cylindric in age; bracts lanceolate, glabrous or ciliate; sepals oval, 2.5–3 mm. long, white or slightly tinged with purple; filaments 8–10 mm. long, dilated above.

In swamps and borders of salt marshes, Humid Transition and Canadian Zones; Alaska and Yukon Territory to Idaho and Oregon. Type locality: Sitka, Alaska. May–Aug.

3. *Sanguisorba microcephala* Presl. Small-headed Great Burnet. Fig. 2466.

Sanguisorba microcephala Presl, Epimil. Bot. 202. 1849.

Sanguisorba Menziesii Rydb. N. Amer. Fl. 22: 387. 1908.

Glabrous perennial with a rootstock and a slender stem, 1–2 m. high, branched above. Leaves 3–10 dm. long, the upper reduced; leaflets oblong-ovate, 1–4 cm. long, rounded at the apex, cordate at the base, coarsely serrate; spike oblong-cylindric, dense, 15–25 mm. long; bracts ovate, pubescent; sepals dark purple, oval, 2–2.5 mm. long; filaments 3–7 mm. long; fruiting hypanthium narrowly 4-winged.

Swamps, Boreal Zones; Alaska to northern California. Type locality: Nootka Sound. July–Sept.

18. *ACAËNA* L. Mant. 2: 145. 1771.

Shrubby or perennial herbs with more or less woody caudices. Leaves unequally pin-

nate, with stipules adnate to the petioles. Flowers in spikes or racemes, the lower usually remote. Hypanthium ellipsoid, contracted at the throat, covered with barbed prickles. Sepals 3–5, usually 4. Petals none. Stamens 3–5, inserted in the mouth of the hypanthium. Pistil usually 1, style terminal; stigma many-cleft. Achenes wholly enclosed in the indurated echinate hypanthium. Seeds solitary, pendent. [Greek, meaning a thorn, in reference to the spines on the hypanthium.]

About 40 species, mainly in the southern hemisphere, extending into Mexico, California, and the Hawaiian Islands. Type species, *Acaena elongata* L.

1. *Acaena californica* Bitter. California Acaena. Fig. 2467.

Acaena californica Bitter, Bibl. Bot. 1774: 116. 1910.

Stems simple or rarely branching, 1–7 dm. high from a short branched woody caudex, sparingly villous. Basal leaves crowded, with 11–17 leaflets, glabrous or slightly ciliate above, appressed-silky beneath, leaflets 5–10 mm. long, obovate in outline, pinnatifid, with 3–7 linear or linear-lanceolate callus-tipped divisions; stem leaves similar but usually few and reduced; flowers green, in a crowded spike, or the lower remote; sepals linear-oblong, about 3 mm. long; filaments long-exserted, purple; style 1 mm. long; fruiting hypanthium ovoid, 4-angled with 2–4 stout prickles on the angles.

Dry grassy slopes near the coast; Sonoma County to Monterey County, California. Type locality: no definite locality given in the original publication. March–June.

This species has long been confused with a Chilean species, *Acaena trifida* Ruiz & Pav., to which it is closely related. Bitter recognizes five varieties, all from the vicinity of San Francisco.

19. AGRIMONIA L. Sp. Pl. 448. 1753.

Perennial herbs with rootstocks and conspicuous stipules. Leaves unequally pinnate, with small leaflets interposed between the larger ones. Flowers in narrow spicate racemes, small, regular, perfect. Hypanthium in fruit obconical or hemispherical, constricted at the throat, usually longitudinally 10-grooved, bearing a ring of hooked bristles above. Sepals 5, connivent. Petals 5, small, yellow. Stamens 5–15. Pistils 2; stigmas 2-lobed; ovules pendulous. Fruit dry, mostly reflexed; achenes 1 or 2. [Ancient Latin name.]

About 15 species, natives of the north temperate zone. Besides the following, five others occur in the eastern and southern states. Type species, *Agrimonia eupatoria* L.

1. *Agrimonia gryposepala* Wallr. Tall Hairy Agrimony. Fig. 2468.

Agrimonia eupatoria var. *hirsuta* Muhl. Cat. 47. 1813.

Agrimonia gryposepala Wallr. Beitr. Bot. 1: 49. 1842.

Agrimonia hirsuta Bicknell, Bull. Torrey Club 23: 509. 1896.

Stems 6–15 dm. high, glandular-puberulent interspersed with long widely spreading hairs. Principal leaflets mostly 7, 4–12 cm. long, mostly lanceolate or oblanceolate, acute, coarsely serrate, resinous-glandular beneath and sparingly hirsute on the veins; racemes 2–4 dm. long; pedicels 2–10 mm. long; petals obovate, about 3 mm. long, yellow; fruiting hypanthium 4–5 mm. long and about as broad, strongly grooved with rounded ridges, the dilated marginal rim bearing numerous bristles.

Moist woods and thickets, Transition and Upper Sonoran Zones; Mendocino, Lake, and San Bernardino Counties, California; also in the eastern United States and Mexico. Type locality: Pennsylvania. July–Sept.

20. ADENÓSTOMA Hook. & Arn. Bot. Beechey 139. 1832.

Unarmed evergreen shrubs with small coriaceous entire fascicled stipulate leaves and small white flowers in terminal paniced racemes. Hypanthium obconical, 5-toothed, 10-striate. Petals 5, orbicular. Stamens 10–15, inserted in bundles alternate with the petals. Pistil 1, simple; style lateral; ovary 1-celled, 1–2-ovuled. Achenes enclosed by the hardened persistent hypanthium. [Greek, gland, mouth, in reference to the glands on the mouth of the calyx.]

Leaves club-shaped, fascicled; throat of the hypanthium with fleshy glands.

1. *A. fasciculatum*.

Leaves filiform, scattered; throat of the hypanthium without glands.

2. *A. sparsifolium*.

1. *Adenostoma fasciculatum* Hook. & Arn. Common Chamise. Fig. 2469.

Adenostoma fasciculatum Hook. & Arn. Bot. Beechey 139. pl. 30. 1832.

Adenostoma fasciculatum var. *densiflorum* Eastw. Bull. Torrey Club 32: 199. 1905.

Shrubs 1–4 m. high with reddish glabrous or puberulent virgate branches and grayish bark, becoming shreddy. Stipules small, acute; leaves fascicled, linear-subulate, 4–8 mm. long, pungently acute, glabrous, often resinous; flowers crowded, sessile; hypanthium bracted at base, green, 2 mm. long; sepals shorter than the small petals; ovary obliquely truncate.

A common shrub of the chaparral, Upper Sonoran Zone; Lake County, California, to northern Lower California. April–June. Type locality: Monterey, California. A thicket of this was known among Spanish Californians as "*chamisal*," May–July.

Adenostoma fasciculatum var. *obtusifolium* S. Wats. Bot. Calif. 1: 184. 1876. Distinguished from the typical form by the obtuse leaves, and pubescent twigs. The common form on the mesas and hills of southwestern San Diego County, California, and adjacent Lower California.

2. *Adenostoma sparsifolium* Torr. Yerba del Pasmo, Ribbon Wood. Fig. 2470.

Adenostoma sparsifolium Torr. in Emory, Notes Mil. Rec. 140. 1848.

An arborescent, yellowish-green and resinously glandular shrub, 2-6 m. high, with reddish-brown trunks, old bark exfoliating. Leaves narrowly linear, alternate, not fascicled, 7-15 mm. long, glandular; flowers in open showy panicles; sepals rounded, whitish, 2 mm. long, half the length of the white elliptic petals; stamens shorter than the petals.

Chaparral, Upper Sonoran Zone; rare in the Santa Monica Mountains, common in the San Jacinto Mountains, California, extending southward to northern Lower California. Type locality: Warner's Pass, San Diego County, California. July-Nov. Thin-leaved Chamise.

21. *DRYAS* L. Sp. Pl. 501. 1753.

Low depressed caespitose shrubs with short spreading branches. Leaves alternate, petioled, simple, toothed or entire. Flowers solitary on naked peduncles. Sepals 8-10, persistent, nearly distinct. Petals 8-10. Stamens numerous, inserted in the mouth of the little developed saucer-shaped hypanthium. Pistils numerous, sessile; style terminal, persistent, elongated and plumose in fruit. Fruit 1-seeded, indehiscent; seed basal, ascending. [Name, Latin, a wood-nymph.]

Three species, natives of the arctic and cold temperate regions of the north temperate zone. Type species, *Dryas octopetala* L.

1. *Dryas Drummondii* Richards. Drummond's Mountain Avens. Fig. 2471.

Dryas Drummondii Richards. in Hook. Bot. Mag. 57: pl. 2972. 1830.

Dryas octopetala var. *Drummondii* S. Wats. Bibl. Index 1: 281. 1878.

Dryades Drummondii Kuntze, Rev. Gen. Pl. 215. 1891.

Stems prostrate, caespitose, young branches white-tomentose. Leaves elliptical or obovate, 1-3 cm. long, densely white-tomentose beneath, dark green and glabrous or nearly so above, firm, veiny and somewhat rugose, coarsely crenate-serrate, the margins of the teeth slightly revolute; petioles 1-3 cm. long; scape 5-20 cm. long, white-tomentose and with a few scattered black hairs above; hypanthium densely covered with black glandular hairs; petals yellow, oblong-spatulate, about 1 cm. long, almost erect; fruiting styles 3-4 cm. long.

Rocky slopes and ledges, Arctic-Alpine Zone; Alaska, Mackenzie River, and Quebec to the Blue Mountains, Oregon, and Montana. Type locality: Canadian Rocky Mountains. June-Aug.

22. *GÈUM* L. Sp. Pl. 500. 1753.

Perennial herbs with rootstocks and odd-pinnate or pinnatifid, stipulate leaves with large terminal lobes. Flowers cymose or solitary, yellow, white or purple. Hypanthium persistent, turbinate or hemispherical, usually 5-bracteate. Sepals 5. Petals 5, orbicular to cuneate, obtuse or emarginate. Stamens numerous, inserted on a disk at the base of the hypanthium; filaments filiform. Pistils numerous, on a short clavate receptacle; styles terminal, filiform, strongly curved and geniculate above, the upper portion deciduous. Achenes small with a hooked beak. Seed erect, with a membranous coat. [The ancient Latin name.]

About 40 species, most abundant in the north temperate zone, a few in southern South America, one in South Africa. Type species, *Geum urbanum* L.

Lower portion of style glandular-puberulent.

Lower portion of style not glandular.

1. *G. macrophyllum*.

2. *G. strictum*.

1. *Geum macrophyllum* Willd. Large-leaved Avens. Fig. 2472.

Geum macrophyllum Willd. Enum. Hort. Ber. 557. 1809.

Geum urbanum var. *oregonense* Scheutz, Nova Acta Soc. Sci. Upsal. III. 76: 26. 1870.

Geum oregonense Rydb. Bull. Torrey Club 25: 56. 1898.

Stems stout, erect, bristly pubescent, 3-10 dm. high. Stipules broad, foliaceous; basal leaves petioled, lyrate-pinnate, the terminal leaflet much the largest, 6-10 cm. broad, reniform, orbicular or cordate, crenulate-dentate, 3-7-lobed; lateral leaflets 3-6, oval or obovate, with smaller ones interspersed; stem leaves short-petioled or sessile, the divisions 2-4, rhombic to oblanceolate; flowers corymbiform; bractlets linear, minute; sepals 3-5 mm. long; petals yellow, 4-8 mm. long; receptacle short-pubescent; lower internode of style glandular-puberulent.

Wet meadows, Boreal and Transition Zones; Alaska to Newfoundland, south to southern California, Montana, and New Hampshire; also eastern Siberia. Type locality: Kamchatka. May-Aug.

2. *Geum strictum* Ait. Yellow Avens. Fig. 2473.

Geum strictum Ait. Hort. Kew. 2: 217. 1789.

Stems erect or ascending, hirsute, 5-15 dm. high. Basal leaves lyrate-pinnate, pubescent or glabrate; terminal leaflet broadly obovate or cuneate, variously cleft or divided and doubly dentate, 2-10 cm. broad; principal lateral leaflets 4-8, cuneate or obovate; upper stem leaves 3-foliolate, short-petioled; flowers few on ascending pedicels; bractlets linear; sepals 6 mm. long; petals yellow, 5-8 mm. long, receptacle densely short-pubescent; lower internode of style 4-5 mm. long, glabrous throughout, or sparingly hispid at the base, the upper internode hirsute.

Wet meadows or swamps, Boreal Zones; British Columbia to Newfoundland, south to New Mexico, Missouri, and New Jersey. Not definitely known from the Pacific States but common on Vancouver Island. Type locality: North America. June-Aug.



2465. *Sanguisorba sitchensis*
2466. *Sanguisorba microcephala*
2467. *Acaena californica*

2468. *Agrimonia gryposepala*
2469. *Adenostoma fasciculatum*
2470. *Adenostoma sparsifolium*

2471. *Dryas Drummondii*
2472. *Geum macrophyllum*
2473. *Geum strictum*

23. *SIEVÉRSIA* Willd. Ges. Nat. Freunde Berlin Mag. 5: 397. 1811.

Perennial usually tufted herbs with rootstocks. Basal leaves lyrate or odd-pinnately divided, usually with smaller segments interspersed; stem leaves usually reduced; stipules large, adnate to the petioles. Flowers cymose or solitary, yellow or purple. Hypanthium turbinate or hemispherical, usually 5-bracteolate. Sepals 5. Petals 5. Stamens numerous; filaments filiform. Pistils numerous; styles terminal, filiform, not jointed, generally elongated in fruit. Fruit a hairy achene; seed erect, basal. [Name in honor of J. A. C. Sievers, Russian botanist.]

About 15 species of arctic or alpine regions. Type species, *Dryas anemonoides* Pall.

Styles much elongated in fruit, plumose to near the apex.

Petals much exceeding the obtusish sepals; hypanthium turbinate or hemispherical.

Petals shorter than or about equaling the acute or acuminate sepals.

Bracts well exceeding the sepals.

Bracts mostly shorter than the sepals.

Styles not greatly elongated in fruit and not plumose; hypanthium nearly saucer-shaped.

1. *S. campanulata*.

2. *S. ciliata*.

3. *S. canescens*.

4. *S. gracilipes*.

1. *Sieversia campanulata* (Greene) Rydb. Bell-shaped Purple Avens. Fig. 2474.

Erythrocoma campanulata Greene, Leaflets Bot. Obs. 1: 178. 1906.

Sieversia campanulata Rydb. N. Amer. Fl. 22: 409. 1908.

Stems 10–25 cm. high from a thick, short rootstock, 1–3-flowered, purple tinged, finely soft-hairy. Basal leaves 3–7 cm. long; rachis silky-pilose; principal leaflets rather crowded, obovate-cuneate, 10–15 mm. long, pilose, 3–6-cleft more than half way to the base into linear-oblong divisions; bractlets linear or linear-subulate, about 5 mm. long; hypanthium hemispheric, reddish purple, viscid; sepals ovate, obtusish, 6–7 mm. long; petals broadly oval, well exceeding the sepals, tinged and veined with crimson.

Ridges, Canadian Zone; Olympic Mountains, Washington, and Saddle Mountain, Oregon. Type locality: Olympic Mountains. June–Aug.

2. *Sieversia ciliata* (Pursh) G. Don. Long-plumed Purple Avens, Prairie-Smoke. Fig. 2475.

Geum ciliatum Pursh, Fl. Amer. Sept. 352. 1814.

Sieversia ciliata G. Don, Gen. Hist. Pl. 2: 528. 1832.

Geum pubescens Hook. Fl. Bor. Amer. 1: 175. 1832.

Erythrocoma ciliata Greene, Leaflets Bot. Obs. 1: 177. 1906.

Erect from a stout rootstock, 3–5 dm. high, soft-hairy throughout. Basal leaves tufted, 10–20 cm. long; principal leaflets 9–19, obovate in outline, 2–5-divided, the divisions cleft and toothed with linear lobes or teeth; bractlets linear-subulate, usually exceeding the sepals; sepals ovate-lanceolate, acuminate, 8–10 mm. long; petals oval, yellowish or tinged with purple, about equaling the sepals; plumose portions of style about 3 cm. long, the upper glabrous portion about 3–4 mm. long.

Open hillsides, Arid Transition and Canadian Zones; British Columbia and Alberta, south to eastern Washington, Utah, and New Mexico. Type locality: banks of the Kooskooskie (Idaho). April–June.

3. *Sieversia canescens* (Greene) Rydb. Downy Purple Avens. Fig. 2476.

Erythrocoma canescens Greene, Leaflets Bot. Obs. 1: 178. 1906.

Erythrocoma grisea Greene, Leaflets Bot. Obs. 1: 178. 1906.

Sieversia canescens Rydb. N. Amer. Fl. 22: 409. 1908.

Stems erect, 2–4 dm. high, finely pilose throughout, mostly 3-flowered. Basal leaves 8–15 cm. long, the rachis hirsute; principal leaflets obovate-cuneate, 10–25 mm. long, densely soft-hairy, ciliate on the margins and veins, mostly 2–3-lobed scarcely half-way to the base, the lobes with 2 or 3 broadly oblong-ovate teeth; bractlets oblong-linear or lanceolate, mostly shorter than the sepals; sepals ovate or ovate-lanceolate, acute, about 1 cm. long; petals elliptical, somewhat exceeding the sepals; plumose portion of fruiting style about 3 cm. long, the glabrous portion 3 mm. long.

Dry open hillsides, mainly Arid Transition Zone; eastern Oregon and Wyoming, south to California, Arizona, and Chihuahua. Type locality: San Francisco Mountains, Arizona. June–Aug.

4. *Sieversia gracilipes* (Piper) Greene. Slender Purple Avens. Fig. 2477.

Potentilla gracilipes Piper, Bull. Torrey Club 27: 392. 1900.

Sieversia gracilipes Greene, Leaflets Bot. Obs. 1: 4. 1903.

Acomastylis gracilipes Greene, Leaflets Bot. Obs. 1: 174. 1906.

Acomastylis depressa Greene, loc. cit.

Stems from a thick tufted rootstock and caudex, 6–8 cm. high, pubescent, 1-flowered. Basal leaves many, pinnatifid, silvery sericeous on both surfaces, 4–6 cm. long; divisions 9–21, broadly cuneate in outline, 3-cleft at the apex or entire; stem leaves 1 or 2, small, entire, or 3-lobed; bractlets elliptic, smaller than the sepals; sepals broadly ovate, acutish, 6–7 mm. long; petals orbicular, 7–10 cm. long; ovaries hairy; styles glabrous, as long as the fruit.

Mountain cliffs, Boreal Zones; Blue Mountains, Oregon. Type locality: "face of north cliffs, Blue Mountains, Oregon, at the head of Anthony Creek, altitude 8,000 feet." June–Aug.

24. *FALLÛGIA* Endl. Gen. 1246. 1840.

Shrubs with stramineous branches and scaly bark. Leaves pinnately divided into small linear divisions, revolute on the margins, deciduous. Stipules present, small. Flowers terminal, peduncled, solitary or few. Hypanthium hemispheric, persistent. Sepals 5, imbricate. Bractlets present. Petals 5, orbicular, spreading, white. Stamens numerous, inserted in 3 series on the margin of the hypanthium. Pistils numerous on the conical receptacle, villous; style terminal; stigma minute; ovules solitary, erect, basal. Achenes oblong, coriaceous, villous, tipped by the elongated plumose styles. Seeds linear; embryo with inferior radicle. [Name in honor of V. Falugi, Abbot of Vallombrosa.]

A monotypic genus of western North America.

1. *Fallugia paradóxa* (D. Don) Endl. Apache Plume. Fig. 2478.

Sieversia paradoxa D. Don, Trans. Linn. Soc. 14: 576. 1825.

Geum cercocarpoides DC. Prod. 2: 554. 1825.

Fallugia mexicana Walp. Rep. 2: 46. 1841.

Fallugia paradoxa Endl. ex Torr. in Emory, Notes Mil. Rec. 140. 1848.

Fallugia paradoxa var. *acuminata* Wooton, Bull. Torrey Club 25: 306. 1901.

Much branched shrub, 5–15 dm. high, the pale whitish branchlets pilose. Leaves with 3–7 linear divisions, 1–2 cm. long, rusty-lepidote beneath, pubescent or glabrate above; flowers few, in corymbose cymes; hypanthium 4–5 mm. broad, silky-villous; sepals variable, 8–10 mm. long, the outer lanceolate, acuminate-caudate, the inner ovate or broadly oval; bractlets subulate to lanceolate, shorter than the sepals; petals obovate, about 2 mm. long; pistils numerous; styles in fruit 3–4 cm. long.

Gravelly or rocky slopes, mainly Lower Sonoran Zone; eastern Mojave Desert, California, to Nevada, southern Colorado, Arizona, western Texas, and Mexico. Type locality: Mexico. May–June.

25. *COWÀNIA* D. Don, Trans. Linn. Soc. 14: 574. 1825.

Shrubs or small trees with alternate coriaceous glandular-dotted leaves. Flowers terminal, solitary on short branches. Hypanthium persistent, more or less turbinate. Sepals 5, imbricate. Petals 5, obovate, spreading. Stamens numerous, in two series, inserted in the throat of the hypanthium. Pistils 1–12, distinct, densely hirsute; style terminal, plumose, persistent and elongated in fruit; ovules solitary. Achenes striate, villous-hirsute; seeds linear; radicle inferior. [Name in honor of John Cowan, British merchant and botanist.]

About 6 species, natives of the southwestern United States and Mexico. Type species, *Cowania mexicana* D. Don.

1. *Cowania Stansburiana* Torr. Stansbury's Cowania. Fig. 2479.

Cowania Stansburiana Torr. in Stansbury's Exp. 386. 1852.

C. mexicana var. *Stansburiana* Jepson, Man. Fl. Pl. Calif. 498. 1925.

Erect shrub, 1–3.5 m. high with gray shreddy bark, and reddish brown glandular twigs. Leaves obovate in outline, 8–15 mm. long, pinnately 3–5-divided, glandular-punctate and green above, more or less tomentulose beneath, the divisions linear or narrowly oblong and usually cleft or toothed, revolute on the margins; pedicels 2–8 mm. long, with stalked glands; hypanthium turbinate-funneliform, 4–6 mm. long, more or less glandular and tomentose when young; sepals 4 mm. long, broadly ovate, obtuse or acutish, about equaling the tube; petals yellow to white, broadly obovate, 8–10 mm. long; pistils 5–10; styles 4–5 cm. long in fruit.

Hillside and dry washes of the desert region, Upper and Lower Sonoran Zones; Nevada, Utah, and southern Colorado, south to the Providence Mountains, southern California, New Mexico, and northern Mexico. Type locality: Stansbury Island, Great Salt Lake, Utah. April–Sept.

This species has been confused with *Cowania mexicana* D. Don of central Mexico which has a campanulate hypanthium and leaves without secondary divisions.

Cowania álba Goodding, Bot. Gaz. 37: 55. 1904. (*C. mexicana* var. *dubia* Brandg. Zoe 5: 149. 1903.) Apparently only a form of *C. Stansburiana* with fewer (1–3) pistils and shorter fruiting styles. Providence Mountains, California to southern Nevada.

26. *PÛRSHIA* DC. ex Poir. in Lam. Encycl. Suppl. 4: 623. 1816.

Erect shrubs or small trees, with alternate, apparently fascicled, deeply 3-cleft leaves. Flowers solitary, terminating short branches. Hypanthium persistent, turbinate or funnel-form. Sepals 5, imbricate. Petals 5, yellow. Stamens about 25, in one series, inserted on the margin of the hypanthium. Pistils 1, rarely 2, oblong-lanceolate, tapering into a short style; ovule solitary, erect. Fruit an achene tipped by the slightly elongated persistent style; seed without endosperm; radicle inferior. [Name in honor of Frederick Pursh, author of one of the earliest North American floras.]

Two species, natives of western North America. Type species, *Tigarea tridentata* Pursh.

Leaves pubescent above, densely tomentose beneath; glands not sunken into the tissue of the leaves.

Leaves glabrous at least above; glands sunken into the tissue of the leaves.

1. *P. tridentata*.

2. *P. glandulosa*.

1. *Purshia tridentata* (Pursh) DC. Northern Antelope Bush. Fig. 2480.*Tigarea tridentata* Pursh, Fl. Amer. Sept. 333. 1814.*Purshia tridentata* DC. Trans. Linn. Soc. 12: 158. 1817.*Kunzia tridentata* Spreng. Syst. 2: 275. 1825.

Shrub 1–3 m. high with brown or grayish bark, the young twigs somewhat tomentose and glandular. Leaves cuneate in outline, 5–30 mm. long, 3-lobed at the apex, thick and revolute-margined, white-tomentose beneath, glabrate or slightly pubescent above, the lobes oblong-linear; flowers short-pedicelled; hypanthium funnelform, about 4 mm. long; sepals oblong, 3–4 mm. long; petals yellow, spatulate-obovate, 7–9 mm. long; achene fusiform, with the short style 15 mm. long, velvety-pubescent and glandular; seeds black.

Dry slopes, mainly Arid Transition Zone; British Columbia and Montana to central California (mostly east of the Sierra Nevada) and New Mexico. Type locality: prairies of the Rocky Mountains [Montana]. May–June.

2. *Purshia glandulosa* Curran. Mojave Antelope Bush. Fig. 2481.*Purshia glandulosa* Curran, Bull. Calif. Acad. 1: 153. 1885.*Kunzia glandulosa* Greene, Pittonia 2: 299. 1892.*Purshia tridentata* var. *glandulosa* M. E. Jones, Proc. Calif. Acad. II, 5: 680. 1895.

Shrub, 1–6 m. high with brown or gray bark, young twigs prominently glandular but otherwise glabrous. Leaves cuneate in outline, 5–10 mm. long, 3-lobed or rarely 5-lobed at apex, somewhat tomentose when young, becoming green and glabrous in age, conspicuously glandular-punctate, the lobes linear-oblong, revolute; flowers short-pedicelled; hypanthium funnelform, 5 mm. long, tomentulose; sepals elliptic, 3 mm. long; petals yellow, spatulate, 5–6 mm. long; achene fusiform, with the style about 15 mm. long, short-pubescent; seed flesh-colored.

Dry slopes, Arid Transition and Upper Sonora Zones; especially in the desert regions, southern Sierra Nevada, California, and southern Nevada to northern Lower California and Arizona. Type locality: Mojave side of Tehachapi Pass. April–June.

27. *CHAMAEBATIA* Benth. Pl. Hartw. 308. 1848.

Erect glandular-pubescent shrubs with a strong resinous odor. Leaves twice or thrice pinnate with numerous minute segments, persistent. Flowers in terminal few-flowered paniculate cymes. Hypanthium persistent, turbinate-campanulate. Sepals 5, valvate. Petals 5, white, spreading. Stamens numerous, in several series on the throat of the calyx. Pistils solitary; style terminal, not elongated in fruit; ovules solitary, erect, basal. Fruit an obovoid coriaceous achene; seed with scanty endosperm; radicle inferior. [Name Greek, meaning low and bramble.]

A California genus of two species. Type species, *Chamaebatia foliolosa* Benth.

Leaves ovate or obovate in outline; leaflets tipped with a small more or less stalked gland; ovary hirsute.

1. *C. foliolosa*.

Leaves lanceolate in outline; leaflets tipped with a prominent gland half sunken in the tissue of the leaflets; ovary glabrous.

2. *C. australis*.1. *Chamaebatia foliolosa* Benth. Mountain Misery. Fig. 2482.*Chamaebatia foliolosa* Benth. Pl. Hartw. 308. 1848.

An erect shrub 3–10 dm. high, with numerous leafy branches, the young twigs glandular-hirsute and tomentulose but the entire integument soon exfoliating leaving a smooth dark brown bark. Leaves ovate to obovate in outline, 2–10 cm. long, 1.5–6 cm. wide, viscid, glandular-hirsute on the rachis and its branches, mostly thrice pinnate, ultimate divisions elliptical, tipped with a small more or less stalked gland; hypanthium glandular-hispid; sepals lanceolate, short-acuminate, not mucronate, about 4 mm. long; petals obovate, 6–8 mm. long; ovary more or less white-hirsute.

Open pine forests, often abundant, Arid Transition Zone; Shasta County to Tulare County, California. Type locality: "Excursion to Bear Valley," Nevada County, California. May–July. Bear Clover.

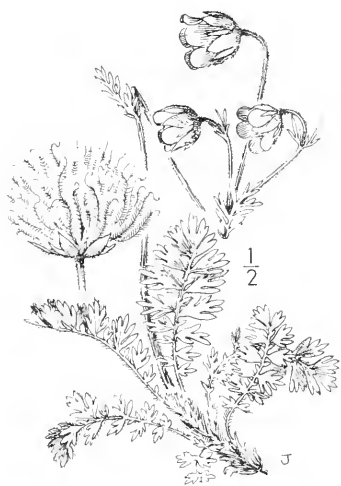
2. *Chamaebatia australis* (Brandg.) Abrams. Southern Chamaebatia. Fig. 2483.*Chamaebatia foliolosa* var. *australis* Brandg. Bot. Gaz. 27: 447. 1899.*Chamaebatia australis* Abrams, Bull. Torrey Club 34: 263. 1907.

Low shrub intricately branched and leafy, bark almost black. Leaves lanceolate in outline, 3–6 cm. long, 1–2 cm. wide, mostly twice pinnate, viscid-pubescent, the rachis and its branches rather sparsely beset with stout-stalked glands, ultimate divisions oval or rounded, tipped with a large sessile gland partially sunken in the tissue; cymes 1–4-flowered; hypanthium tomentose and glandular-hirsute; sepals 3 mm. long, abruptly mucronate; petals white, broadly obovate, 4–5 mm. long; ovary glabrous.

Dry chaparral ridges, Upper Sonoran Zone; San Miguel Mountain, San Diego County, California, and northern Lower California. Type locality: La Grulla, Lower California. April–May.

28. *CERCOCÁRPUS* H. B. K. Nov. Gen. & Sp. 6: 232. 1823.

Small trees or shrubs, with dark colored hard wood and smooth bark. Leaves alternate, simple, stipulate, evergreen, entire or toothed. Flowers small, apetalous, axillary or terminal, solitary or fascicled. Hypanthium salverform, the lower part persistent, but the campanulate limb deciduous; sepals 5, broadly triangular to nearly subulate. Stamens



2474



2475



2476



2477



2478



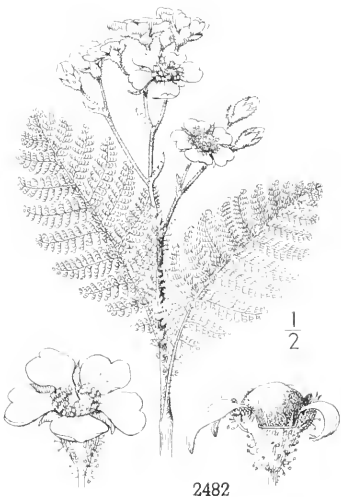
2479



2480



2481



2482

2474. *Sieversia campanulata*
2475. *Sieversia ciliata*
2476. *Sieversia canescens*

2477. *Sieversia gracilipes*
2478. *Fallugia paradoxa*
2479. *Cowania Stansburiana*

2480. *Purshia tridentata*
2481. *Purshia glandulosa*
2482. *Chamaebatia foliolosa*

15 or more, inserted in two or three rows on the limb of the hypanthium. Pistil 1; style terminal; ovule solitary, ascending. Fruit a coriaceous terete villous achene, included in the elongated persistent hypanthium and tipped with the elongated twisted plumose style; seed linear. [Greek, meaning shuttle and fruit, in allusion to the fruit and its twisted plumose style.]

Approximately 10 species, confined to the Rocky Mountains and Pacific Coast region of the United States, extending southward through the Cordilleras of Mexico. Type species, *Cercocarpus fothersgilloides* H. B. K.

Leaves serrate or dentate.

Upper surface of the leaves with impressed veins, the lower conspicuously white-tomentose.

1. *C. Traskiae*.

Upper surface of the leaves with the veins not impressed, the lower surface glabrate, strigose or somewhat tomentose.

2. *C. montanus*.

Leaves with coarse ovate teeth.

Leaves with short triangular apiculate teeth.

Leaves more or less pubescent beneath and grayish; sepals broadly triangular.

Hypanthium villous-tomentose; petioles 4–10 mm. long; leaves mostly over 2.5 cm. long.

3. *C. alnifolius*.

Hypanthium appressed-pubescent; petioles 2–4 mm. long; leaves mostly less than 2.5 cm. long.

4. *C. betuloides*.

Leaves glabrous or essentially so beneath and bright yellowish-green; sepals nearly subulate.

5. *C. minutiflorus*.

Leaves with entire more or less revolute margins, linear to oblong-elliptic.

Leaves 15–30 mm. long, the margins only slightly revolute.

6. *C. ledifolius*.

Leaves 5–15 mm. long, the margins strongly revolute almost to the midrib.

7. *C. intricatus*.

1. *Cercocarpus Traskiae* Eastw. Trask's Mountain-mahogany. Fig. 2484.

Cercocarpus Traskiae Eastw. Proc. Calif. Acad. III. 1: 136. 1898.

Shrub or small tree, 3–7 m. high, with a trunk up to 20 cm. in diameter, the bark rough, grayish brown, the branchlets densely tomentose. Leaves rounded to oval, 25–60 mm. long, obtuse at the apex, subcordate, truncate or rarely cuneate at base, dentate or nearly entire, glabrous and shining above in age, densely white-tomentose beneath; lateral veins 7–8, very prominent beneath; flowers in fascicles of 3–7; hypanthium about 1 cm. long, densely villous-tomentose, its limb and broadly triangular sepals 5–8 mm. in diameter; style in fruit about 5 cm. long.

A rare insular species, known only from Santa Catalina Island, southern California. March–April.

2. *Cercocarpus montanus* Raf. Colorado Mountain-mahogany. Fig. 2485.

Cercocarpus montanus Raf. Atlant. Journ. 146. 1832.

Cercocarpus parvifolius Nutt. ex Hook. & Arn. Bot. Beechey 337. 1838.

Cercocarpus macrourus Rydb. N. Amer. Fl. 22: 420. 1913.

Shrub 1–3 m. high with thin grayish brown bark and sparingly villous branchlets soon becoming glabrous. Leaves oval to obovate, 25–50 mm. long, coarsely dentate above the middle, dark green and eventually glabrous above, pale and finely tomentose beneath, rounded or obtuse at apex, cuneate at base; hypanthium villous-pilose, its limb and sepals about 6–7 mm. in diameter; fruiting style 5–8 cm. long.

Dry hills and mountain slopes, Upper Sonoran and Transition Zones; South Dakota and New Mexico west to Montana and Utah; also in northeastern California and adjacent Oregon. The western plants are *C. macrourus* Rydb. Type locality: Rocky Mountains [Colorado]. March–May.

3. *Cercocarpus alnifolius* Rydb. Island Mountain-mahogany. Fig. 2486.

Cercocarpus betulaeifolius var. *Blanchae* C. K. Schneid. Mitt. Deuts. Dendr. Ges. 14: 127, in part. 1905.

Cercocarpus alnifolius Rydb. N. Amer. Fl. 22: 421. 1913.

Small tree, 5–10 m. high, with rough grayish bark, young branchlets sparsely tomentose, soon glabrate and reddish brown. Leaves oval to ovate-oval or round-oval, 3–6 cm. long, sparingly appressed-pubescent above when young, thinly tomentulose beneath, dentate with short broad teeth, lateral veins 6 or 7 pairs; hypanthium tube about 12 mm. long, villous-tomentose, the limb 6–7 mm. wide; sepals broadly triangular; styles 5–6 cm. long in fruit, usually strongly curved.

Hillsides and canyons, Upper Sonoran Zone; Santa Cruz and Santa Catalina Islands, California. Type locality: Avalon, Santa Catalina Island. March–April.

4. *Cercocarpus betuloides* Nutt. California Mountain-mahogany. Fig. 2487.

Cercocarpus betuloides Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 427. (June) 1840.

Cercocarpus betulaeifolius Nutt. ex Hook. Ic. Pl. 322. (Oct.) 1840.

Cercocarpus parvifolius var. *glaber* S. Wats. Bot. Calif. 1: 175. 1876.

Cercocarpus parvifolius var. *betuloides* Sarg. Silva 4: 66. 1892.

Cercocarpus Douglasii Rydb. N. Amer. Fl. 22: 421. 1913.

Cercocarpus rotundifolius Rydb. loc. cit.

Shrub or small tree, 3–8 m. high, with smooth bark, covered with deciduous scales, the branchlets glabrous or sparingly hairy. Leaves obovate or oval, 2–5 cm. long, rounded at the apex, cuneate at base, serrate above the middle, sparingly appressed-hairy when young, soon glabrate, dark green above, paler beneath; hypanthium silky-tomentose, its limb 6 mm. broad; sepals broad-triangular; fruiting style 6–10 cm. long.

A common component of the chaparral, Upper Sonoran Zone; southwestern Oregon to northern Lower California. Type locality: Santa Barbara, California. March–April. Hardtack.

The above description is of the typical form, which is common in the California Coast Ranges from Sonoma County to Los Angeles County. The plants in the northern part of California and in the Sierra Nevada are more tomentose, and the young leaves and hypanthium are villous with spreading hairs. In the San Gabriel and San Bernardino Mountains, the leaves are much thicker and more coriaceous with prominent veins beneath. In the Cuyamaca Mountains the foliage becomes soft-downy beneath. Several species have been proposed for these variations.

5. *Cercocarpus minutiflorus* Abrams. Smooth Mountain-mahogany. Fig. 2488.

Cercocarpus minutiflorus Abrams, Bull. Torrey Club 37: 149. 1910.

Shrub 2–3 m. high, with herbage glabrous throughout. Leaves obovate, cuneate at base, serrate-toothed on the rounded summit, 1–2 cm. long, shining yellowish green beneath; pedicels slender, 6–7 mm. long; hypanthium tube 10–12 mm. long, 1 mm. broad, the limb 2–3 mm. broad, minutely and sparsely tomentulose; sepals subulate-triangular.

Chaparral slopes, Upper Sonoran Zone; hills and mountain slopes of San Diego County, California. Type locality: dry chaparral-covered hills near San Dieguito (Bernardo). March–April.

6. *Cercocarpus ledifolius* Nutt. Curl-leaved Mountain-mahogany. Fig. 2489.

Cercocarpus ledifolius Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 427. 1840.

Cercocarpus hypoleucus Rydb. N. Amer. Fl. 22: 424. 1913.

A small tree or shrub, 2–9 m. high, with red-brown furrowed bark covered with persistent scales, the branchlets canescent, soon becoming glabrous. Leaves narrowly lanceolate, 1–3 cm. long, acute at the apex, narrowed at base to a short petiole, the margins revolute, entire, thick-coriaceous, usually glabrous above, resinous and tomentulose beneath; flowers solitary or in axillary clusters of 2 or 3, sessile; hypanthium white-villous-tomentose.

Open rocky ridges, Arid Transition and Canadian Zones; eastern Washington to Montana, and southward of the Cascade-Sierra Nevada Divide to southern California and Colorado. Type locality: "Rocky Mountains in alpine situations on the summits of the hills of Bear River [Idaho]." April–May.

7. *Cercocarpus intricatus* S. Wats. Little-leaved Mountain-mahogany. Fig. 2490.

Cercocarpus intricatus S. Wats. Proc. Amer. Acad. 10: 346. 1875.

Cercocarpus ledifolius var. *intricatus* M. E. Jones, Zoe 2: 14. 1891.

Low intricately branched shrub, 5–15 dm. high, young branchlets pubescent. Leaves oblong, but strongly revolute, 5–10 mm. long, thick, dark green and glabrate above, white-tomentose beneath; hypanthium tube 4–6 mm. long, tomentulose, the limb 3 mm. wide; persistent style of achene 2–4 cm. long.

Desert ranges and mountain slopes, mainly Arid Transition Zone; (White, Panamint, and Providence Mountains) California to Utah and Arizona. Type locality: American Fork Canyon, Utah. May.

29. COLEÓGYNE Torr. Pl. Frem. 8. 1853.

Shrubs with opposite spinescent branches and minute stipules. Leaves in opposite fascicles, linear-clavate, entire, deciduous. Flowers solitary terminating short branchlets, subtended by trifid bracts. Hypanthium coriaceous. Sepals 4, united at the base, persistent. Corolla none. Stamens 30–40; filaments filiform. Pistil 1; ovary 1-celled; ovule 1, hemitropous; style lateral, filiform, exserted, bent and twisted, villous. Fruit an achene. [Name Greek, meaning sheath or scabbard and ovary.]

A monotypic genus of western North America.

1. *Coleogyne ramosissima* Torr. Black Bush. Fig. 2491.

Coleogyne ramosissima Torr. Pl. Frem. 8. 1853.

Shrub 0.5–2 m. high with divergent branches, ashy gray, becoming black in age. Leaves linear-clavate, 5–15 mm. long, flat on the upper surface, with 5 rounded longitudinal ridges on the lower, strigose; sepals oblong-lanceolate, acute and mucronate, 7–8 mm. long, coriaceous and strigose, the inner with broad, scarious, brownish or yellowish margins; sheath between the pistil and stamens 4–5 mm. long; achene about 5 mm. long, brown.

Desert mesas and foothills, Upper and Lower Sonoran Zones; Mojave and Colorado Deserts, southern California, to southern Utah, southwestern Colorado, and Arizona. Type locality: sources of the Mojave and Virgin Rivers. April–July.

30. RÛBUS [Tourn.] L. Sp. Pl. 492. 1753.

Low shrubs or trailing vines, usually prickly, with alternate leaves, the stipules adnate to the petioles. Flowers terminal or axillary, solitary, racemose or paniced, white or purplish, mostly perfect. Hypanthium persistent, bractless. Sepals 5. Petals 5. Stamens many, inserted on the hypanthium, distinct. Carpels many, inserted on a convex or elongated receptacle, ripening into drupelets and forming an aggregate fruit. Ovules 2, 1 abortive; style terminal, slender. Seed pendulous. [The ancient name of the bramble, from *ruber*, red.]

About 200 species, widely distributed, but most abundant in the north temperate zone. Type species, *Rubus fruticosus* L.

- Styles club-shaped; receptacle flat, drupelets tipped with a hard pubescent cushion. 1. *R. parviflorus*.
 Styles filiform; receptacle convex to conical; drupelets without cushion.
 Stems herbaceous, never prickly, rarely bristly, stoloniferous; stipules broad, free or nearly so.
 Leaves simple or 3-foliate; drupelets pubescent. 2. *R. lasiococcus*.
 Leaves 5-foliate; drupelets glabrous. 3. *R. pedatus*.
 Stems woody, usually prickly, sometimes merely bristly.
 Stipules broad, free or nearly so. 4. *R. nivālis*.
 Stipules narrow, linear-lanceolate or subulate, more or less adnate to the petioles.
 Drupelets united into a thimble-shaped aggregate fruit, falling off from the dry receptacle.
 Flowers solitary or few; petals rose-colored, much exceeding the sepals. 5. *R. spectabilis*.
 Flowers clustered; petals white, usually shorter than the sepals.
 Inflorescence corymbose; fruit nearly black.
 Leaves white-tomentose beneath. 6. *R. leucodermis*.
 Leaves green and glabrous beneath. 7. *R. nigerrimus*.
 Inflorescence racemose; fruit red. 8. *R. melanolasius*.
 Drupelets distinct, adhering to the fleshy receptacle, falling with it or falling separately.
 Flowers dioecious, with decumbent biennial densely prickly stems; leaves 1-3-foliate. 9. *R. vitifolius*.
 Flowers perfect; leaflets 5-foliate. 10. *R. laciniatus*.

1. *Rubus parviflorus* Nutt. Thimble Berry. Fig. 2492.

Rubus parviflorus Nutt. Gen. 1: 308. 1818.
Rubus nutkanus Moc. ex Ser. in DC. Prod. 2: 566. 1825.
Rubus nutkanus var. *Nuttallii* Torr. & Gray, Fl. N. Amer. 1: 450. 1840.
Rubus lacer Kuntze, Meth. Sp. 103. 1879.
Rubacer parviflorum Rydb. Bull. Torrey Club 30: 274. 1903.
Bossekia parviflora Greene, Leaflets Bot. Obs. 1: 211. 1906.
Rubus nutkanus var. *parviflorus* Focke, Bibl. Bot. 1772: 124. 1911.

Stems erect, 1-2.5 m. high, without prickles; bark smooth or somewhat glandular-pubescent, becoming brown and shreddy. Leaves palmately 5-lobed, cordate at base, unequally serrate, 10-15 cm. broad, glabrous or somewhat tomentose on the veins beneath; petioles and peduncles hirsute-glandular; flowers few, corymbose, white, 2-4 cm. broad; sepals tipped with a long slender appendage; fruit separating from the receptacle when ripe, hemispheric, red.

In open woods and among bushes, mainly Transition Zone; southern Alaska to western Ontario, south to New Mexico. Type locality: island of Michilimackinac, Lake Huron. March-Aug.

Rubus parviflorus var. *velutinus* (Hook. & Arn.) Greene, Bull. Torrey Club 30: 274. 1903. Leaves densely pilose beneath, otherwise not essentially differing from the typical form. This is the common form throughout the most of California, especially near the coast.

2. *Rubus lasiococcus* A. Gray. Hairy-fruited Dwarf Bramble. Fig. 2493.

Rubus lasiococcus A. Gray, Proc. Amer. Acad. 17: 201. 1882.
Comarobatia lasiococca Greene, Leaflets Bot. Obs. 1: 245. 1906.

Unarmed herbaceous perennial, with slender creeping pubescent stems, rooting at the nodes, the flowering branches ascending, 5-10 cm. long, 1-3-leaved. Leaves simple or ternate, reniform, 3-6 cm. broad, serrate-dentate sparsely pubescent above and on the veins beneath; flowers 1 or 2, pedicels slender, 1-5 cm. long; sepals ovate, acuminate, 6-7 mm. long; petals white, slightly exceeding the sepals; fruit greenish or rose-colored, 1 cm. in diameter, pubescent; putamen smooth.

Wooded mountain slopes, Boreal Zones; British Columbia south to the Siskiyou Mountains, southern Oregon. Type locality: Oregon, near Mount Hood. June-Aug.

3. *Rubus pedatus* Smith. Five-leaved Dwarf Bramble. Fig. 2494.

Rubus pedatus Smith, Pl. Ic. Ined. pl. 63. 1791.
Dalibarda pedata Stephan, Mém. Soc. Nat. Mosc. 1: 129. 1806.
Comaropsis pedata DC. Prod. 2: 555. 1825.
Ametron pedatum Raf. Sylva Tell. 161. 1838.
Psychrobattia pedata Greene, Leaflets Bot. Obs. 1: 245. 1906.

Unarmed herbaceous perennial, with glabrous creeping stems, rooting at the nodes, the flowering branch very short. Leaves 1-4, approximate, pedately 5-foliate (rarely 3-foliate); leaflets obovate, irregularly incised, glabrous or very sparsely pubescent, 1-5 cm. long, petioles slender, 3-10 cm. long; flower solitary, on very slender peduncles, 4-10 cm. long; sepals foliaceous, 8-10 mm. long, often lobed; petals white, equaling the sepals, spreading or reflexed; drupelets 1-6, 8-10 mm. long; putamen rugose.

Woods, Boreal Zones; Yukon and Alaska to Alberta, Idaho, and the Cascades of central Oregon and Humboldt County, California. Type locality: western part of North America, definite locality not given. May-July.

4. *Rubus nivālis* Dougl. Snow Dwarf Bramble. Fig. 2495.

Rubus nivālis Dougl. ex Hook. Fl. Bor. Amer. 1: 181. 1832.
Rubus pacificus Macoun, Ottawa Nat. 16: 213. 1903.
Cardiobatus nivālis Greene, Leaflets Bot. Obs. 1: 244. 1906.

Perennial, with slightly woody creeping puberulent stems, 3-12 dm. long, sparingly armed with curved prickles. Leaves simple or sometimes ternate, ovate, cordate or rounded-cordate, more or less distinctly 3-lobed, dentate with broad abruptly mucronate teeth, glabrous or sparingly hispid; floral branches short; flowers usually solitary; sepals 7-9 mm. long, the outer



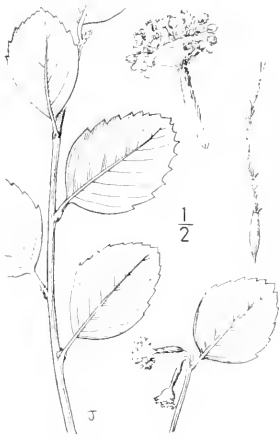
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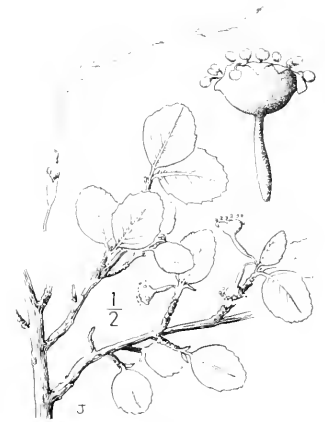
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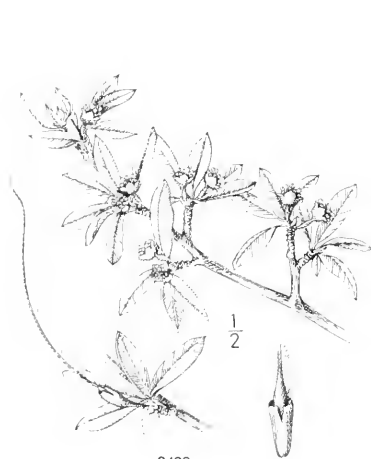
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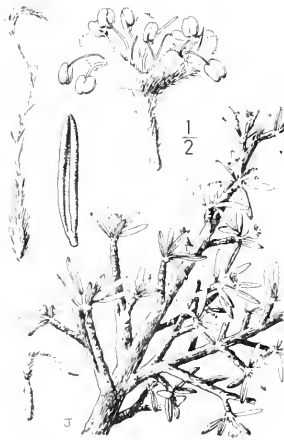
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2491

2483. *Chamaebatia australis*
2484. *Cercocarpus Traskiae*
2485. *Cercocarpus montanus*

2486. *Cercocarpus alnifolius*
2487. *Cercocarpus betuloides*
2488. *Cercocarpus minutiflorus*

2489. *Cercocarpus ledifolius*
2490. *Cercocarpus intricatus*
2491. *Coleogyne ramosissima*

foliaceous, reflexed in anthesis; hypanthium more or less prickly; petals dull purple, linear-lanceolate; pistils few; drupelets pubescent, large, red; putamen faveolate.

Deep coniferous woods, or on open ridges, Canadian Zone; British Columbia and Idaho to western Oregon. Type locality: high sunny ridges of the Rocky Mountains. June–Aug.

5. *Rubus spectabilis* Pursh. Salmon Berry. Fig. 2496.

Rubus spectabilis Pursh, Fl. Amer. Sept. 348. 1814.

Rubus stenopetalus Cham. ex Choris, Voy. Pitt. Kamtch. 10. 1822.

Parmena spectabilis Greene, Leaflets Bot. Obs. 1: 244. 1906.

Stems shrubby, 2–5 m. high, glabrous or pilose when young, with yellowish shreddy bark, unarmed or with small straight prickles. Leaves usually 3-foliolate; petioles 4–6 cm. long, slender, usually unarmed; leaflets thin, green and sparingly pubescent on both sides, doubly serrate, the terminal 4–10 cm. long, acuminate at the apex, truncate or cuneate at base, the lateral obliquely ovate; flowers 2–4 or usually solitary; sepals ovate, about 1 cm. long; petals reddish purple, elliptical, 15–20 mm. long; fruit ovoid, 15–20 mm. long, red or yellow, drupelets numerous, falling off together, glabrous; putamen strongly reticulate.

Stream banks, Humid Transition Zone; Aleutian Islands to Idaho and Mendocino County, California. Type locality: banks of the Columbia. March–July.

Rubus spectabilis var. *Menzièsii* S. Wats. Bot. Calif. 1: 172. 1876. (*Rubus franciscanus* Rydb. N. Amer. Fl. 22: 441. 1913.) Leaves densely pilose beneath, otherwise closely resembling typical *R. spectabilis*. Coastal region of central California from Sonoma County to Santa Cruz County.

6. *Rubus leucodermis* Dougl. White-stemmed Raspberry. Fig. 2497.

Rubus leucodermis Dougl. ex Torr. & Gray, Fl. N. Amer. 1: 454. 1840.

Rubus occidentalis leucodermis Focke, Abh. Nat. Ver. Bremen 4: 147. 1874.

Melanobatus leucodermis Greene, Leaflets Bot. Obs. 1: 243. 1906.

Melanobatus bernardinus Greene, op. cit. 1: 244.

Rubus bernardinus Rydb. N. Amer. Fl. 22: 444. 1913.

Stems erect, 4–8 dm. high, glaucous, armed with stout, straight or recurved prickles. Leaves 3-foliolate or rarely 5-foliolate; leaflets ovate to lanceolate-acuminate, doubly serrate, white-tomentose beneath; the veins, petioles and peduncles prickly; stipules setaceous; flowers few, corymbose, 1 cm. broad; sepals lanceolate, long-acuminate, exceeding the petals; ovaries tomentose; fruit separating from the receptacle when ripe, yellowish red with a white bloom and agreeable flavor.

Open woods, Transition Zone; British Columbia and Montana to Utah and southern California. Type locality: Oregon. The southern California plants (*R. bernardinus*) have the pedicels and hypanthium glandular-hispid. April–July.

7. *Rubus nigerrimus* (Greene) Rydb. Dark Raspberry. Fig. 2498.

Rubus hesperius Piper, Erythra 5: 103. 1897. Not Rogers, 1896.

Melanobatus nigerrimus Greene, Leaflets Bot. Obs. 1: 244. 1906.

Rubus nigerrimus Rydb. N. Amer. Fl. 22: 445. 1913.

Stems biennial, 1–2 m. high, glaucous becoming brown and shining in age, strongly armed with straight flat prickles. Leaves 3-foliolate or 5-foliolate, petioles, rachis and ribs armed with recurved prickles; leaflets 5–8 cm. long, ovate, acuminate, coarsely and doubly serrate, green and glabrous on both surfaces; flowers in terminal corymbs; hypanthium and sepals glabrous or sparingly glandular; petals white, 3–4 mm. long; fruit nearly black, without bloom; drupelets tomentose; putamen strongly faveolate-reticulate.

Canyon slopes, Upper Sonoran Zone; eastern Washington. Type locality: Snake River Canyon at Wawawai and Almota, Whitman County, Washington. May–July.

8. *Rubus melanolasius* Focke. Rocky Mountain Raspberry. Fig. 2499.

Rubus melanolasius Focke, Abh. Nat. Ver. Bremen 13: 469. 1896.

Batidaea lactissima Greene, Leaflets Bot. Obs. 1: 240. 1906.

Batidaea unicolor Greene, op. cit. 1: 241.

Batidaea Sandbergii Greene, op. cit. 1: 242.

Stems biennial, erect, 0.5–1 m. high, purple or yellow and often glaucous, densely armed with slender straight bristles. Leaves 3–5-foliolate; stipules subulate; petioles, rachis and mid-veins usually bristly and glandular; leaflets 3–6 cm. long, ovate to lanceolate, short-acuminate, densely white-tomentose beneath; inflorescence a short terminal or axillary raceme, glandular-hispid; petals elliptical, 5–6 mm. long, erect; fruit red or purplish red, very sour; drupelets numerous, tomentose; putamen reticulate.

Usually on rocky slopes, Canadian Zone; British Columbia and Alberta to eastern Oregon, Utah, and Colorado. Type locality: raised from seeds from northwestern America.

9. *Rubus vitifolius* Cham. & Sch. Pacific Blackberry. Fig. 2500.

Rubus vitifolius Cham. & Sch. Linnaea 2: 10. 1827.

Rubus macropetalus Dougl. ex Hook. Fl. Bor. Amer. 1: 178. 1832.

Rubus ursinus var. *glabratus* Presl, Epimel. Bot. 197. 1851.

Rubus Helleri Rydb. N. Amer. Fl. 22: 460. 1913.

Stems woody, weak and trailing or suberect, 1–6 m. long, somewhat glaucous, armed with straight, slender prickles. Leaves pinnately 3–5-foliolate or those of the flowering branches only deeply lobed; leaflets ovate to oblong, coarsely toothed, glabrous or nearly so beneath; flowers

dioecious, staminate large with elongated petals, pistillate small with broad petals; fruit persistent on the receptacle, oblong, black and sweet, glabrous or nearly so.

Stream banks and open woods especially in burned areas, mainly Humid Transition Zone; British Columbia and Idaho south along the coast to San Francisco, California. Type locality: San Francisco, California. March-Aug.

Rubus vitifolius subsp. *ursinus* (Cham. & Sch.) Abrams. (*Rubus ursinus* Cham. & Sch. *Linnaea* 2: 11. 1827. *Rubus Menziesii* Hook. Fl. Bor. Amer. 1: 179. 1832. *Rubus Eastwoodianus* Rydb. N. Amer. Fl. 22: 460. 1913.) Distinguished from the typical form chiefly by the more pubescent leaves which are more or less densely soft-pubescent and canescent on the lower surface. This subspecies replaces the typical species throughout California except along the northern coast, extending south to northern Lower California, mainly Upper Sonoran Zone. Type locality: San Francisco, California.

10. *Rubus laciniatus* Willd. Evergreen or Cutleaved Blackberry. Fig. 2501.

Rubus laciniatus Willd. Hort. Berol. pl. 82. 1807.

Rubus vulgaris var. *laciniatus* Dippel, Hanb, Laubb. Deuts. Dendr. Ges. 3: 529. 1893.

Stems woody, perennial, climbing, 3-5 m. long, armed with numerous stout recurved prickles. Leaves 5-foliolate, or those of the floral branches 1-3-foliolate; leaflets pinnately cleft or parted and laciniately incised, sparsely pubescent beneath; petioles prickly; flowers in corymbs; sepals pubescent and prickly; petals white or pinkish, often incisedly cleft; fruit black, globose, 12-15 mm. in diameter.

An escape from cultivation and becoming naturalized, especially in western Washington and Oregon. Type locality: unknown. May-Aug.

31. *RÔSA* [Tourn.] L. Sp. Pl. 491. 1753.

Prickly shrubs with odd-pinnate leaves, adnate stipules and large solitary or corymbose flowers. Hypanthium globose or urceolate. Bractlets none. Sepals 5. Petals 5, rounded, spreading. Stamens many on the silky disk, which lines the hypanthium. Pistils many, included in the hypanthium, but free and distinct; styles subterminal; ovules solitary, pendulous. Achene bony, enclosed in the fleshy, enlarged, red, berry-like hypanthium. [The ancient Latin name of the rose.]

A genus of approximately 125 species, natives of the northern hemisphere. Type species, *Rosa centifolia* L.

Pistils numerous; styles and upper part of hypanthium persistent in fruit.

Sepals spreading or reflexed in fruit and tardily deciduous; leaves glandular-pruinose beneath and sweet-scented. 1. *R. rubiginosa*.

Sepals erect and persistent in fruit; leaves scarcely or not at all sweet-scented.

Flowers mostly solitary; petals normally over 2 cm. long; leaflets glabrous above; fruit 12-20 mm. thick.

Pedicels and calyx not bristly.

Leaflets double-toothed.

Prickles straight or nearly so.

Prickles stout, more or less flattened below; petioles not pilose. 2. *R. nutkana*.

Prickles slender, nearly terete; petioles distinctly pilose. 3. *R. pinetorum*.

Prickles strongly curved. 4. *R. myriadenia*.

Leaflets simple-toothed. 5. *R. Spaldingii*.

Pedicels and sepals densely bristly; hypanthium densely bristly. 6. *R. Macdougalii*.

Flowers mostly corymbose, if solitary petals less than 2 cm. long; fruit usually less than 10 mm. thick.

Hypanthium smooth or rarely pilose.

Leaves pubescent or puberulent.

Rachis and leaflets more or less pubescent and often glandular.

Leaflets double-toothed, the teeth, lower surface of leaflets and rachis distinctly glandular. 7. *R. Aldersonii*.

Leaflets mostly simple-toothed, the lower surface and rachis scarcely glandular. 8. *R. californica*.

Rachis and lower surface of leaflets finely puberulent, not glandular.

Leaflets elliptical to oval, nearly equally green on both surfaces.

Sepals glandular-hispid on the back. 9. *R. pisocarpa*.

Sepals not glandular-hispid.

Stems sparsely prickly; leaflets firm. 10. *R. ultramontana*.

Stems densely prickly; leaflets thin. 11. *R. gratissima*.

Leaflets obovate, pale and more or less glaucous beneath. 12. *R. Macounii*.

Leaves glabrous throughout.

Leaflets broadly oval, 3-5 cm. long. 13. *R. rivalis*.

Leaflets elliptic, rarely 3 cm. long. 14. *R. mohavensis*.

Hypanthium densely glandular-hispid.

Leaflets rather thin and green, not glaucous. 15. *R. spithamea*.

Leaflets firm and distinctly glaucous. 16. *R. sonomensis*.

Pistils few; styles and upper part of hypanthium deciduous in fruit.

Leaflets glabrous beneath. 17. *R. gymnocarpa*.

Leaflets pubescent beneath. 18. *R. Bridgesii*.

1. *Rosa rubiginosa* L. Sweetbrier. Fig. 2502.

Rosa rubiginosa L. Mant. 2: 564. 1771.

Rosa micrantha Borrer ex Smith, Engl. Bot. pl. 2490. 1813.

Rosa suaveolens Pursh, Fl. Amer. Sept. 346. 1814.

Rosa Walpoleana Greene, Leaflets Bot. Obs. 2: 264. 1912.

Stems branched, 1.5-2.5 m. high, often forming long wands, armed with stout flat recurved

prickles. Stipules glandular-ciliate; rachis of the leaves pubescent and glandular and often sparsely prickly; leaflets 5-7, usually doubly serrate, densely glandular-pubescent and resinous beneath, very aromatic; flowers pink to white; hypanthium smooth or often with a few prickles; sepals lanceolate, usually laciniately lobed, spreading, deciduous; fruit ovoid, 12-18 mm. long.

Pastures and waste places; western Washington to northwestern California, especially abundant in western Oregon. Naturalized from Europe. The Eglantine of Chaucer and Shakespeare. May-July.

2. *Rosa nutkana* Presl. Nootka Rose. Fig. 2503.

Rosa nutkana Presl, Epimel. Bot. 203. 1851.

Rosa anacantha Greene, Leaflets Bot. Obs. 2: 265. 1912.

Rosa columbiana Rydb. N. Amer. Fl. 22: 514. 1918.

Stems stout, erect, 0.5-1.5 m. high, usually armed with large paired straight or somewhat curved prickles, the floral branches glabrous or nearly so. Stipules 1-2 cm. long, more or less glandular-dentate; petioles and rachis more or less puberulent or short-pubescent and often with interspersed stalked glands; leaflets usually 7, 1.5-5 cm. long, broadly ovate, rounded at both ends or acute at apex, doubly serrate, with glandular teeth, dark green and glabrous above, paler and somewhat glandular-puberulent or slightly pubescent on the veins beneath; flowers usually solitary; pedicels glabrous or sometimes glandular-hispid; hypanthium glabrous; sepals lanceolate, 2-3 cm. long, cordate-acuminate, often with foliaceous entire appendages, glabrous or rarely glandular on the back; petals 25-35 mm. long, broadly obovate; hypanthium globose, 15-18 mm. broad in fruit.

Canadian and Transition Zones; Alaska to Wyoming and northern California. Type locality: Nootka Sound, British Columbia. May-July.

Rosa nutkana var. *muriculata* (Greene) G. N. Jones, Madroño 3: 128. 1935. Leaflets oval, 15-30 mm. long, doubly serrate, the lower surface with muriculate glands interspersed with the pilose pubescence. Mostly near the coast, Humid Transition and Canadian Zones; British Columbia to Mendocino County, California.

3. *Rosa pinetorum* Heller. Pine Rose. Fig. 2504.

Rosa pinetorum Heller, Muhlenbergia 1: 53. 1904.

Rosa Brownii Rydb. Bull. Torrey Club 44: 70. 1917.

Rosa gymnocarpa var. *pinetorum* Jepson, Man. Fl. Pl. Calif. 500. 1925.

Stems erect, slender, 0.5-1 m. high, armed with straight usually terete prickles, the sterile shoots also often bristly. Leaves 5-7-foliolate; stipules pilose and glandular on the back; rachis and petioles glandular and pilose; leaflets broadly oval, 1-3 cm. long, pilose and glandular beneath, doubly serrate with gland-tipped teeth; pedicels glabrous; petals broadly obovate, about 2-3 cm. long; fruit about 12 mm. in diameter.

Open woods, Transition Zone; Shasta County to Monterey County, and central Sierra Nevada, California. Type locality: Monterey, California. May-July.

Rosa Durandii Crépin, Bull. Soc. Bot. Fr. 22: 19. 1875. Stems erect, 2-3 m. high, brown, with stout flat curved prickles, about 15 mm. long, the branches pubescent and densely glandular-hispid. Leaves 5-9-foliolate; petioles unarmed, pubescent and very glandular; leaflets broadly oval, glabrous above, densely glandular-granuliferous beneath, double-toothed with gland-tipped teeth; hypanthium glabrous or glandular at base, globose, in fruit 12-15 mm. broad; sepals broadly lanceolate, caudate-attenuate, entire, glandular on the back. A little-known species, Queen Charlotte Island, *Davidson 8144*, and Oregon, *Elihu Hall 146*. Type locality: Oregon, without definite locality.

4. *Rosa myriadenia* Greene. Glandular Rose. Fig. 2505.

Rosa myriadenia Greene, Leaflets Bot. Obs. 2: 263. 1912.

Stems low, with spreading branches, armed with slender terete distinctly curved infrastipular prickles. Leaves 5-foliolate; stipules broad, densely glandular and slightly prickly; leaflets oval, 1-2 cm. long, doubly serrate, with gland-tipped teeth, dark green and glabrous above, densely pilose beneath and glandular on the veins; flowers 1-3; pedicels glabrous; hypanthium globose, with a short neck; sepals caudate-attenuate, glandular-hispid and sometimes prickly on the back.

Transition Zone; southern Oregon, west of the Cascade Mountains. Type locality: Huckleberry Mountain, Jackson County, Oregon. May-July.

5. *Rosa Spaldingii* Crépin. Spalding's Rose. Fig. 2506.

Rosa macrocarpa Raf. Med. Fl. 2: 258. 1830. Not Méral, 1812.

Rosa Spaldingii Crépin, Bull. Soc. Bot. Belg. 12: 420. 1876.

Stems erect, about 1 m. high, brown, usually with straight infrastipular prickles, 5-10 mm. long, young shoots usually bristly, flowering branches glabrous, sparsely prickly. Leaves 5-7-foliolate; petioles and rachis puberulent and sometimes slightly glandular; leaflets oval or broadly oval, 1.5-5 cm. long, coarsely toothed, the teeth seldom double and scarcely glandular, light green and glabrous above, pale and puberulent beneath; flowers usually solitary; pedicels glabrous; hypanthium glabrous; sepals lanceolate, caudate-attenuate, entire, sometimes with foliaceous tips, glabrous or very rarely glandular on the back; fruiting hypanthium globose, 12-18 mm. broad.

British Columbia to eastern Oregon, Wyoming, and Utah. Type locality: Clearwater, Idaho. May-July.

Rosa yainacensis Greene, Pittonia 5: 109. 1903. Stems low and depressed, armed, often densely so, with long straight prickles. Leaves usually 7-foliolate; stipules densely glandular-denticulate; petioles and rachis with numerous short-stalked glands and a few prickles; leaflets oval to obovate, rarely 2 cm. long, doubly toothed, glabrous and dark green above, pale and puberulent beneath; flowers usually solitary; pedicels densely glandular-hispid; hypanthium globose, glabrous; sepals often with foliaceous tips, sparingly glandular-hispid and prickly.

Upper Sonoran and Arid Transition Zones; southern Oregon east of the Cascades, also adjacent California. Type locality: hills of the Yainax Indian Reservation, Oregon. May-July.



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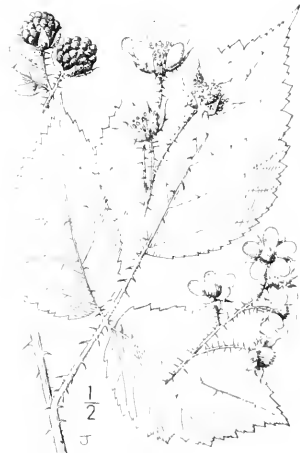
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2492. *Rubus parviflorus*
2493. *Rubus lasiococcus*
2494. *Rubus pedatus*

2495. *Rubus nivalis*
2496. *Rubus spectabilis*
2497. *Rubus leucodermis*

2498. *Rubus nigerrimus*
2499. *Rubus melanolasius*
2500. *Rubus vitifolius*



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2501. *Rubus laciniatus*
 2502. *Rosa rubiginosa*
 2503. *Rosa nutkana*

2504. *Rosa pinetorum*
 2505. *Rosa myriadenia*
 2506. *Rosa Spaldingii*

2507. *Rosa Macdougalii*
 2508. *Rosa Aldersonii*
 2509. *Rosa californica*

6. *Rosa Macdougàlii* Holz. MacDougal's Rose. Fig. 2507.

Rosa nutkana var. *hispidà* Fernald, Bot. Gaz. 19: 335. 1894.

Rosa Macdougàlii Holz. Bot. Gaz. 21: 36. 1896.

Rosa nutkana *Macdougàlii* Piper, Contr. U.S. Nat. Herb. 11: 335. 1906.

Stems erect, 1-2 m. high, armed with straight infrastipular prickles, the floral branches with weaker prickles or unarmed. Leaves 7-foliolate; stipules more or less glandular-toothed; petioles and rachis puberulent and slightly glandular; leaflets oval, 1.5-5 cm. long, glabrous or nearly so above, puberulent or slightly glandular beneath; flowers solitary or rarely corymbose; pedicels glandular-bristly; hypanthium subglobose, densely bristly or prickly, 12-18 mm. thick in fruit; sepals glandular on the back, caudate-attenuate.

Arid Transition Zone; British Columbia and eastern Washington to northern Utah. Type locality: Farmington, Idaho. May-July.

7. *Rosa Aldersònnii* Greene. Alderson's Rose. Fig. 2508.

Rosa californica var. *Petersiana* C. A. Mey. Zimmtr. 19. 1847.

Rosa californica var. *glandulosa* Crépin, Bull. Soc. Bot. Belg. 15: 52. 1876.

Rosa Aldersònnii Greene, Pittonia 5: 110. 1903.

Rosa Breweri Greene, Leaflets Bot. Obs. 2: 262. 1912.

Stems armed with stout recurved prickles. Leaves 5-9-foliolate, pilose and glandular-pubescent throughout; leaflets broadly oval, obtuse, 15-30 mm. long, more or less doubly serrate with gland-tipped teeth; pedicels pilose and glandular; flowers in few- to several-flowered cymes; sepals pilose and glandular; petals 15-20 mm. long; fruit 8-10 mm. thick, globose or ovoid and short-beaked, glabrous or sparsely pilose toward the base.

Hillsides and thickets, Upper Sonoran Zone; central California to northern Lower California. Type locality: Witch Creek, San Diego County, California. April-Aug.

This species and *californica*, as here treated, constitute two extremely variable groups. A number of segregates have been proposed based largely upon pubescence, the shape of the prickles, and the absence or presence of a neck on the fruit.

8. *Rosa califòrnica* Cham. & Sch. California Rose. Fig. 2509.

Rosa californica Cham. & Sch. Linnaea 2: 35. 1827.

Rosa californica var. *pubescens* Crépin, Bull. Soc. Bot. Belg. 15: 52. 1876.

Rosa Hortwegiana Crépin, Bull. Soc. Bot. Belg. 15: 52, as a synonym. 1876.

A variable species, the typical form with stems erect, much branched, light brown or yellowish, 1-3 m. high, armed with stout flattened recurved prickles, the young shoots usually bristly. Leaves 5-7-foliolate, oval, 1-2 cm. long, usually simply serrate, teeth without glands, dull green and more or less appressed-pubescent above, villous and sometimes slightly glandular beneath; pedicels glabrous or somewhat villous; hypanthium glabrous or rarely sparsely villous, globose or subglobose with a distinct neck, 10-15 mm. broad in fruit; sepals lanceolate, caudate-attenuate, entire, villous and rarely glandular on the margins.

Low ground or moist slopes, often forming thickets, Upper Sonoran and Transition Zones; southern Oregon to northern Lower California. Type locality: San Francisco, California. May-Sept.

9. *Rosa pisocàrpa* A. Gray. Mortar or Cluster Rose. Fig. 2510.

Rosa pisocarpa A. Gray, Proc. Amer. Acad. 8: 382. 1872.

Rosa Copelandii Greene, Leaflets Bot. Obs. 2: 264. 1912.

Rosa Pringlei Rydb. Bull. Torrey Club 44: 79. 1917.

Rosa Eastwoodiae Rydb. N. Amer. Fl. 22: 527. 1918.

Stems slender, 1-2 m. high, armed with weak infrastipular prickles, the floral branches sometimes unarmed. Stipules densely short-pubescent, slightly glandular-dentate; leaflets usually 7, 1-4 cm. long, glabrous above, densely puberulent beneath; flowers corymbose; pedicels glabrous; hypanthium smooth, globose, about 8 mm. broad in fruit; sepals caudate-attenuate, often foliaceous, glandular-hispid on the back.

In moist places, Transition Zone; British Columbia to Idaho and northern California. Type locality: Oregon. May-Aug.

In the northern Sierra Nevada and the Siskiyou Mountains are a series of forms that seem to show hybridization or intergradation between the southern *R. californica*, the northwestern *R. pisocarpa*, and the interior or Great Basin *R. ultramontana*.

10. *Rosa ultramontàna* (S. Wats.) Heller. Interior Rose. Fig. 2511.

Rosa californica var. *ultramontana* S. Wats. Bot. Calif. 1: 187. 1876.

Rosa ultramontana Heller, Muhlenbergia 1: 107. 1904.

Rosa Woodsii var. *ultramontana* Jepson, Fl. Calif. 2: 210. 1936.

Stems rather stout, 1-3 m. high, armed with straight prickles, the floral branches often unarmed and over-topped by long sterile shoots. Stipules puberulent and often denticulate; leaflets normally 7, 2-4 cm. long, oval, coarsely serrate, dull green on both surfaces, glabrous above, puberulent and often pruinose beneath; flowers corymbose; pedicels glabrous; hypanthium glabrous, globose, 8-10 mm. broad in fruit; sepals glabrous or slightly puberulent but not glandular-hispid on the back.

Moist places, Arid Transition Zone; British Columbia to Montana, Nevada, and northern California, east of the Sierra Nevada. Type locality: eastern side of the Sierra Nevada, California. June-Aug.

11. *Rosa gratissima* Greene. Tehachapi Rose. Fig. 2512.

Rosa gratissima Greene, Fl. Fran. 73. 1891.

Stems much branched, 1–2 m. high, densely armed with straight stramineous prickles and bristles, the larger often infrastipular. Stipules puberulent, entire or dentate, not glandular; leaflets 5–7, oval, 1–3 cm. long, glabrous above, puberulent beneath; flowers corymbose; pedicels glabrous or pruinose, sometimes slightly prickly; hypanthium glabrous, globose, about 8 mm. broad in fruit; sepals glabrous on the back.

Moist ground, mainly Arid Transition Zone; central Sierra Nevada, mainly eastern slope, to southern California. Type locality: mountains of Kern County, California. April–Aug.

12. *Rosa Macounii* Greene. Macoun's Rose. Fig. 2513.

Rosa Woodsii Lindl. Bot. Reg. 12: pl. 976. 1826. Not Lindl. 1820.

Rosa Macounii Greene, Pittonia 4: 10. 1899.

Stems 0.5–2 m. high, much branched, usually armed with straight terete prickles, the young shoots bristly; floral branches often unarmed. Stipules glandular-denticulate or entire, puberulent on the back; petioles and rachis puberulent; leaflets 5–7, obovate, cuneate at base, 1–3 cm. long, serrate, green and glabrous above, pale and puberulent beneath; flowers solitary or in few-flowered corymbs; pedicels glabrous; hypanthium globose, smooth, 8–10 mm. broad in fruit; sepals glabrous or sparingly puberulent on the back.

Moist ground, mainly Arid Transition Zone; British Columbia and Saskatchewan to eastern Oregon, Nebraska, and western Texas. Type locality: Assiniboia. June–July.

Rosa Covillei Greene, Leaflets Bot. Obs. 2: 262. 1912. Stems less than 1 m. high, glaucescent, bristly and with weak straight infrastipular prickles. Stipules narrow, glandular-ciliate; petioles and rachis more or less glandular; leaflets 7, oval or obovate, 15–20 mm. long, serrate, glabrous above, puberulent beneath; flowers solitary; pedicels glabrate; hypanthium glabrous, round-ovoid, contracted into a neck, 1.5 mm. broad in fruit; sepals ovate, short-acuminate, about 1 cm. long. Originally collected in the yellow pine forests south of Naylox, Klamath County, Oregon. Perhaps only a local variation of *Rosa Macounii* Greene.

13. *Rosa rivalis* Eastw. Brook Rose. Fig. 2514.

Rosa rivalis Eastw. Bull. Torrey Club 32: 198. 1905.

Stems about 1 m. high, glabrous, armed with scattering slender straight prickles. Stipules glabrous; rachis and petioles glabrous or slightly pubescent; leaflets 5–7, broadly oval, 2–5 cm. long, coarsely toothed, thin, glabrous or sparsely pubescent on the veins beneath; flowers corymbose; hypanthium globose; sepals 1.5–2 cm. long, usually with dilated tips, sparingly glandular on the back; petals about 2 cm. long.

Transition Zone; southern Oregon to central California. Type locality: Laytonville, Mendocino County, California. June–July.

14. *Rosa mohavensis* Parish. Mojave Rose. Fig. 2515.

Rosa californica var. *glabrata* Parish, Erythra 6: 88. 1898.

Rosa mohavensis Parish, Bull. S. Calif. Acad. 1: 87. 1902.

Rosa Woodsii var. *mohavensis* Jepson, Fl. Calif. 2: 210. 1936.

Plant glabrous throughout; stems slender, 5–10 dm. high, armed with nearly straight scattered prickles flattened at base; floral branches short, more or less prickly. Stipules mostly entire; petioles and rachis occasionally with a few prickles; leaflets generally 5, oval to elliptic, 5–15 mm. long, serrate; flowers solitary, rarely 2 or 3; hypanthium globose; sepals caudate-attenuate, about 10 mm. long; petals about 15 mm. long.

Moist places, Upper Sonoran Zone; borders of the Mojave Desert, southern California. Type locality: Cushenberry Springs, on the desert slopes of the San Bernardino Mountains, California. May–July.

15. *Rosa spithamea* S. Wats. Ground Rose. Fig. 2516.

Rosa spithamea S. Wats. Bot. Calif. 2: 444. 1880.

Rosa adenocarpa Greene, Leaflets Bot. Obs. 2: 261. 1912.

Stems low, 1–3 dm. high, from creeping rootstocks, armed with straight, terete, infrastipular prickles and often also bristly. Stipules glandular-ciliate and slightly glandular on the back; petioles and rachis glandular and often with a few prickles; leaflets usually 5, oval to sub-orbicular, 1–3.5 cm. long, doubly serrate with gland-tipped teeth, sparingly pubescent or glabrate above, glandular-pruinose beneath; flowers corymbose or sometimes solitary; pedicels glandular-hispid; hypanthium ellipsoid or subglobose, densely glandular-hispid, 7–8 mm. broad in fruit; sepals densely glandular-hispid on the back.

Open forests, Arid Transition Zone; southwestern Oregon and northwestern California. Type locality: Trinity River, California. June–Aug.

16. *Rosa sonomensis* Greene. Sonoma Rose. Fig. 2517.

Rosa sonomensis Greene, Fl. Fran. 72. 1897.

Rosa spithamea var. *sonomensis* Jepson, Fl. W. Mid. Calif. 279. 1901.

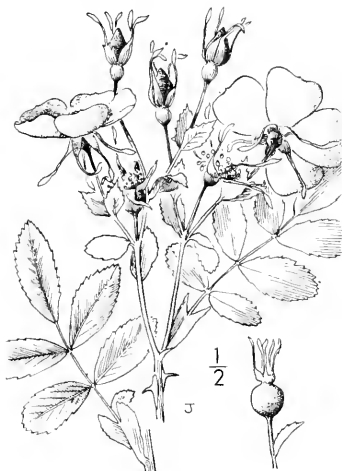
Rosa granulata Greene, Leaflets Bot. Obs. 2: 262. 1912.

Plants much resembling *Rosa spithamea* in size and general habit, differing chiefly in the leaflets which are broadly oval to orbicular, 5–15 mm. long, doubly serrate with glandular teeth, glabrous on both surfaces, firm and somewhat glaucous.

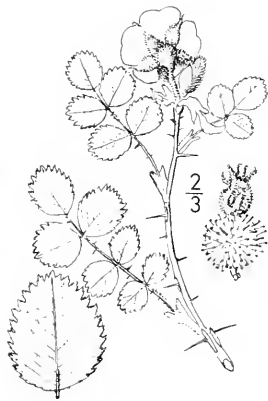
Local on high mountain ridges, Upper Sonoran and Arid Transition Zones; Sonoma and Marin Counties to San Luis Obispo County, California. Type locality: Petrified Forest, Sonoma County. May–Aug.



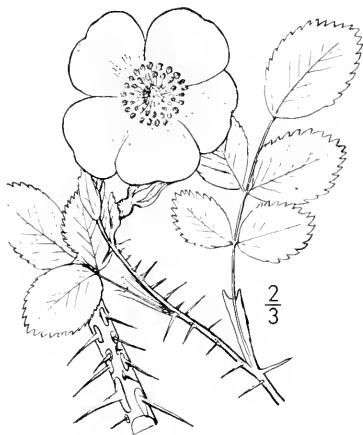
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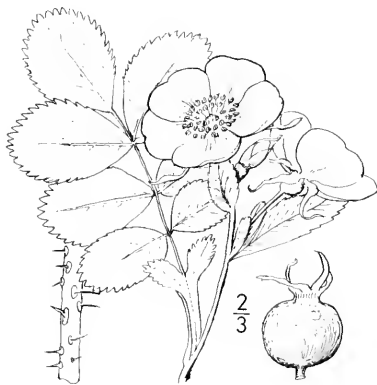
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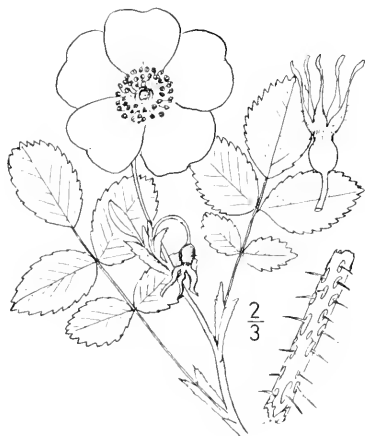
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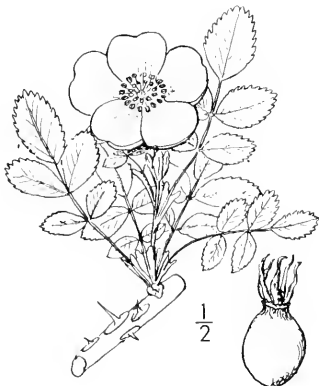
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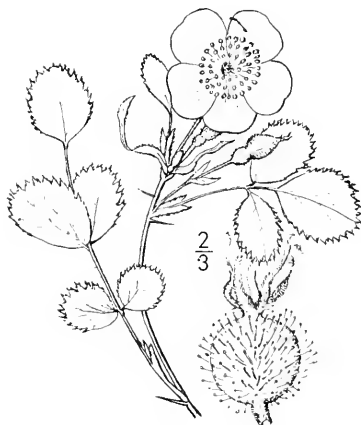
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2510. *Rosa pisocarpa*
2511. *Rosa ultramontana*
2512. *Rosa gratissima*

2513. *Rosa Macounii*
2514. *Rosa rivalis*

2515. *Rosa mohavensis*
2516. *Rosa spithamaea*
2517. *Rosa sonomensis*

17. *Rosa gymnocarpa* Nutt. Wood Rose. Fig. 2518.

Rosa gymnocarpa Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 461. 1840.

Stems slender, erect, 1–3 m. high, often very bristly and with slender infrastipular prickles, the floral branches often unarmed. Stipules narrow, glandular-ciliate and usually dentate; petioles and rachis usually glandular-hispid; leaflets 5–9, suborbicular to elliptic, 1–3 cm. long, thin, glabrous on both surfaces, doubly serrate with gland-tipped teeth; flowers usually solitary; hypanthium ellipsoid, in fruit 4–6 mm. broad; sepals ovate, acuminate, glabrous on the back, deciduous with the styles.

In shady woods, chiefly Humid Transition Zone; British Columbia to Montana and central California. Type locality: in shady woods, Oregon. May–July. Bald-hip Rose.

Greene (Leaflets Bot. Obs. 2: 255–266. 1912) has described ten segregates of this species based on minor vegetative variations.

18. *Rosa Bridgesii* Crépin. Bridges' Rose. Fig. 2519.

Rosa Bridgesii Crépin, Bull. Soc. Bot. Belg. 15: 54. 1876.

Rosa gymnocarpa var. *pubescens* S. Wats. Bot. Calif. 1: 187. 1876.

Rosa crenulata Greene, Leaflets Bot. Obs. 2: 255. 1912.

Rosa oligocarpa Rydb. N. Amer. Fl. 22: 532. 1918.

Stems slender, low and spreading, 2–10 dm. high, armed with straight or slightly curved infrastipular prickles, the floral branches often unarmed. Stipules glandular-ciliate; petioles and rachis puberulent and glandular; leaflets suborbicular to oval, 1–2 cm. long, doubly serrate with gland-tipped teeth, finely pubescent on both surfaces; flowers mostly solitary; pedicels glabrous or somewhat glandular-hispid; hypanthium glabrous, globose, 6–7 mm. broad in fruit; sepals ovate, acuminate, about 8 mm. long, deciduous with the styles.

Open pine forests, Arid Transition Zone; southern Oregon to the southern Sierra Nevada, California. Type locality: California. June–July.

Family 65. AMYGDALACEAE.

PEACH FAMILY.

Trees or shrubs, the bark exuding gum, and the leaves, bark, and seeds containing prussic acid and bitter. Leaves alternate, simple, petioled, serrate or entire, the teeth and petioles often glandular, the stipules small, early deciduous. Flowers in terminal or axillary racemes or corymbs, or sometimes solitary, regular and usually perfect. Hypanthium campanulate or turbinate, free from the ovary, deciduous. Sepals and petals 5, inserted on the rim of the hypanthium. Stamens 10–25, inserted with the petals. Pistils 1 or in one genus 5; ovary 1-celled; ovules 2, pendulous; fruit a more or less fleshy drupe with a bony stone; seeds 1 or rarely 2.

About 6 genera and 120 species, widely distributed, most abundant in the northern hemisphere.

Pistil 1; flowers perfect; leaves serrate.

Pistils usually 5; flowers polygamo-dioecious; leaves entire.

1. *Prunus*.

2. *Osmaronia*.

1. PRUNUS [Tourn.] L. Sp. Pl. 473. 1753.

Trees or shrubs, with deciduous or evergreen leaves. Flowers umbellate, corymbose, or racemose, appearing before or with the leaves, on branches of the same or the previous season. Petals spreading, white or pink. Style terminal. Ovary and fruit glabrous or pubescent. Drupe with a fleshy or sometimes dry, usually edible exocarp, and a bony endocarp, which is smooth or roughened, globose-ovoid, or compressed. [Ancient Latin name of the plum.]

A genus of about 95 species, natives of the north temperate zone, tropical America, and Asia. Type species, *Prunus domestica* L.

Flowers corymbose or umbellate, appearing with or before the leaves on twigs of the previous season; leaves deciduous.

Drupe glabrous (somewhat pubescent in *P. subcordata oregana*), with a pulpy exocarp. (*Prunus*.)

Leaves oblanceolate to oblong-obovate, narrowed at base; drupe 5–6 mm. long, bright red, very bitter.

1. *P. emarginata*.

Leaves orbicular to ovate, rounded or subcordate at base; drupe 20–25 mm. long, purple, edible.

2. *P. subcordata*.

Drupe pubescent, with an almost dry exocarp. (*Emplectocladus*.)

Leaves ovate or suborbicular, rounded or subcordate at base, serrate.

3. *P. Fremontii*.

Leaves spatulate to oblanceolate.

Leaves glabrous, obscurely serrulate; flowers long-pedicelled, 10–15 mm. broad.

4. *P. Andersonii*.

Leaves usually pubescent, entire; flowers subsessile, 4–6 mm. broad.

5. *P. fasciculata*.

Flowers in narrow racemes.

Racemes terminating leafy branches of the season; drupe with a thick fleshy exocarp; leaves deciduous.

(*Padus*.)

6. *P. demissa*.

Racemes in the axils of the leaves on the twigs of the previous season: drupe with a large stone and thin exocarp; leaves evergreen, entire or spinulose-dentate. (*Laurocerasus*.)

Leaves conspicuously spinulose-dentate, strongly undulate-crisped, 2–4 cm. long.

7. *P. ilicifolia*.

Leaves entire or occasionally sparsely spinulose-denticulate, plane or nearly so, 4–8 cm. long.

8. *P. Lyonii*.

1. *Prunus emarginata* (Dougl.) Walp. Bitter Cherry. Fig. 2520.

Cerasus emarginata Dougl. ex Hook. Fl. Bor. Amer. 1: 169. 1834.

Prunus emarginata Walp. Rep. 2: 9. 1843.

Cerasus glandulosa Kell. Proc. Calif. Acad. 1: 59. 1855.

Cerasus arida Greene, Proc. Biol. Soc. Wash. 18. 57. 1905.

Shrub or small tree 1–6 m. high, with smooth bark, young twigs reddish. Leaves oblong-ovate to oblanceolate, acute or acutish at apex, narrowed to near the base, 2–5 cm. long, glandular-serrate, glabrous above and nearly so beneath at least at maturity; flowers appearing with the leaves in small corymbose clusters; hypanthium campanulate, glabrous, about 3 mm. high; sepals oblong, obtuse, about 2 mm. long; petals obovate, 6–7 mm. long; drupe 6–8 mm. in diameter, bright red, very bitter and astringent; stone ellipsoid, somewhat pointed at each end.

Mountain slopes and stream banks, Upper Sonoran and Transition Zones; Vancouver Island and southern British Columbia to western Montana and southern California. Type locality: "On the upper part of the Columbia River, especially about the Kettle Falls." In addition to the cited synonyms, several other segregates have been proposed by Greene. April–May.

Prunus emarginata var. *möllis* (Dougl.) Brewer in Brewer & Wats. Bot. Calif. 1: 167. 1876. Tree, 10–20 m. high. Leaves 3–8 cm. long, elliptic to obovate, obtuse or acute, tomentose beneath; pedicels and hypanthium pubescent. Open woods, Humid Transition Zone; Vancouver Island, western Washington, and western Oregon. Originally collected by Douglas near the mouth of the Columbia River.

2. *Prunus subcordata* Benth. Sierra Plum. Fig. 2521.

Prunus subcordata Benth. Pl. Hartw. 308. 1849.

Shrub 1.5–3 m. high with straggly and rather rigid or somewhat spinescent branches, young twigs glabrous or puberulent, red-brown becoming gray-brown in age. Leaves 2–5 cm. long, elliptic-ovate to suborbicular, obtuse or rounded at apex, obtuse to subcordate at base, serrulate, glabrous or more or less pubescent; petioles 4–10 mm. long; flowers 2–4 in a cluster; pedicels glabrous or pubescent, 8–15 mm. long; hypanthium campanulate, 4–5 mm. high, glabrous or pubescent; sepals about equaling or shorter than the hypanthium, glandular-ciliate; petals obovate, 4–6 mm. long; drupe broadly ellipsoid, 16–20 mm. long, reddish-purple, edible; stone somewhat flattened, the sides nearly smooth except 2–3 low ridges, edges prominently keeled.

Mountain slopes or canyons, Transition Zones; Douglas and Lake Counties, Oregon, to Tulare County and Santa Cruz County, California. Type locality: Sierra Nevada, probably along the American River. March–May.

Prunus subcordata var. *oregana* (Greene) Wight, U.S. Dept. Agric. Bull. 179: 33. 1915. Leaves ovate, abruptly acute or short-acuminate, more or less pubescent; ovary and young fruit densely tomentose; drupe rather narrowly ellipsoid, about 2 cm. long, dark red, more or less pubescent. Klamath County, Oregon, and Modoc County, California.

Prunus subcordata var. *Kellöggii* Lemmon, Pittonia 2: 67. 1890. Drupe yellow, and larger with more and sweeter pulp. This is probably only a minor variant of the species. It is found from the Mount Shasta region to Sierra County, California.

3. *Prunus Fremontii* S. Wats. Desert Apricot. Fig. 2522.

Prunus Fremontii S. Wats. Bot. Calif. 2: 442. 1880.

Amygdalus Fremontii Abrams, Bull. N.Y. Bot. Gard. 6: 385. 1910.

Prunus eriogyna Mason, Journ. Agric. Research 1: 168. f. 5. 1913.

Rigidly branched shrub or small tree, 2–3 m. high with brownish glabrous often spine-tipped twigs. Leaves deciduous, broadly ovate to suborbicular, serrate, 10–25 mm. long, glabrous; petioles slender, 3–4 mm. long; flowers solitary or in few-flowered clusters; pedicels 8–12 mm. long; sepals ciliate; corolla 12–15 mm. broad; drupe about 12 mm. in diameter with a dry exocarp; stone turgid, about 12 mm. long, rounded on the dorsal side, and with a thick wing on the ventral side.

Desert slopes, Upper and Lower Sonoran Zones; Chuckawalla Mountains, southern California, to northern Lower California. Type locality: Oriflamme Canyon, San Diego County, California. Feb.–April.

4. *Prunus Andersonii* A. Gray. Desert Peach. Fig. 2523.

Prunus Andersonii A. Gray, Proc. Amer. Acad. 7: 337. 1868.

Amygdalus Andersonii Greene, Fl. Fran. 49. 1891.

Rigidly branched shrub, 1–2 m. high, armed with divaricate spinescent branchlets. Leaves fascicled, oblanceolate, 1–2 cm. long, narrowed to the subsessile base, obscurely serrulate, glabrous, pale green; flowers usually solitary on short spurs; pedicels 5–8 mm. long; hypanthium glabrous, 2.5 mm. high, sepals 3 mm. long, narrowly lanceolate-triangular; petals broadly obovate, 5–6 mm. long, rose-colored; drupe appressed-globose, 10–14 mm. long, densely brownish-tomentulose; pulp thin and rather dry; stone somewhat roughened.

Desert slopes and mesas, Upper Sonoran Zones; eastern slopes of the Sierra Nevada from Modoc County to Inyo County, California, east to western Nevada. Type locality: "Foothills of the eastern side of the Sierra Nevada, near Carson," Nevada. March–April.

5. *Prunus fasciculata* (Torr.) A. Gray. Desert Almond. Fig. 2524.

Emplectocladus fasciculatus Torr. Pl. Frem. 10. pl. 5. 1853.

Prunus fasciculata A. Gray, Proc. Amer. Acad. 10: 70. 1874.

Amygdalus fasciculata Greene, Fl. Fran. 49. 1891.

Lycium Spenceanae J. F. Macbride, Contr. Gray Herb. 53: 18. 1918.

Shrub 1–2 m. high, with pale gray bark, and divaricately branching often spine-tipped branches, usually pubescent when young. Leaves clustered on short stubby branchlets, deciduous, oblanceolate-spatulate, 8–15 mm. long, narrowed to an indistinct petiole, pale green and pubes-

cent, entire or rarely obscurely serrulate; flowers 1-3 on the short stubby branchlets, subsessile; hypanthium 2 mm. long; petals oblanceolate, about 3 mm. long; drupe ovoid, 8-10 mm. long, densely pubescent; stone smooth, narrowly winged on the ventral side.

Desert slopes, Sonoran Zones; Mojave and Colorado Deserts from Inyo County to Imperial County, California, east to southern Utah and western Arizona. Type locality: "Sierra Nevada, California." March-May.

Prunus fasciculata var. *punctata* Jepson, Fl. Calif. 2: 230. 1936. Young branches densely pubescent. Leaves glandular-punctate, otherwise glabrous. Sandy flats near Bicknell station, northern Santa Barbara County (type locality), also western San Luis Obispo County, California.

6. *Prunus demissa* (Nutt.) Walp. Western Choke Cherry. Fig. 2525.

Cerasus demissa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 411. 1840.

Prunus demissa Walp. Rep. 2: 10. 1843.

Padus demissa M. Roem. Fam. Nat. Syn. 3: 87. 1847.

Erect shrub, 1-5 m. high, with gray-brown bark becoming slightly fissured on old trunks, young twigs usually rather densely hairy, becoming smooth and gray-brown. Leaves oblong-ovate, 3-8 cm. long, acute or abruptly short-pointed at apex, more or less pubescent beneath; petioles about 1 cm. long, with 1 or 2 glands near the base of the blade; racemes 5-10 cm. long, terminating more or less leafy branchlets; sepals short, obtuse; petals orbicular, 5-6 mm. broad; drupe globose, 5-6 mm. broad, red or dark purple, sweet and edible, but astringent; stone globose, smooth.

Ravines and wooded slopes, Upper Sonoran and Transition Zones; Washington and Idaho south to southern California. Type locality: "Plains of the Oregon [Columbia] towards the sea, and at the mouth of the Wahlamet [Willamette]."

Prunus demissa subsp. *melanocarpa* A. Nels. Mitt. Deuts. Dendr. Ges. 1911: 231. 1911. Distinguished from the typical species by the glabrous bright green leaves, glandless petioles, glabrous twigs and black fruit. The common choke cherry of the Rocky Mountains and Great Basin, extending into eastern Oregon and the eastern slopes of the Sierra Nevada, California.

7. *Prunus ilicifolia* (Nutt.) Walp. Holly-leaved Cherry. Fig. 2526.

Cerasus ilicifolia Nutt. ex Hook. & Arn. Bot. Beechey 340. 1832.

Prunus ilicifolia Walp. Rep. 2: 10. 1843.

Laurocerasus ilicifolia M. Roem. Fam. Nat. Syn. 3: 92. 1847.

Arborescent shrub or small tree, 2-9 m. high with a round-topped crown and a trunk up to 3-4 dm. in diameter, bark dark gray-brown and becoming fissured, young twigs red-brown, glabrous. Leaves evergreen, coriaceous, ovate to suborbicular, 2-6 cm. long, spinose-toothed; petioles 8-12 mm. long; racemes 2-6 cm. long; petals broadly obovate, 2-3 mm. long; drupe ovoid-ellipsoid, 12-18 mm. long, dark purple, with a thin fleshy exocarp; stone smooth, slightly obcompressed, apiculate.

Wooded slopes, Upper Sonoran and Transition Zones; Coast Ranges from Napa County, California, to northern Lower California. Type locality: Santa Barbara, California. April-May.

8. *Prunus Lyonii* (Eastw.) Sarg. Catalina Cherry. Fig. 2527.

Prunus occidentalis Nutt. ex Lyon, Bot. Gaz. 11: 202. 333. 1886. Not Sw.

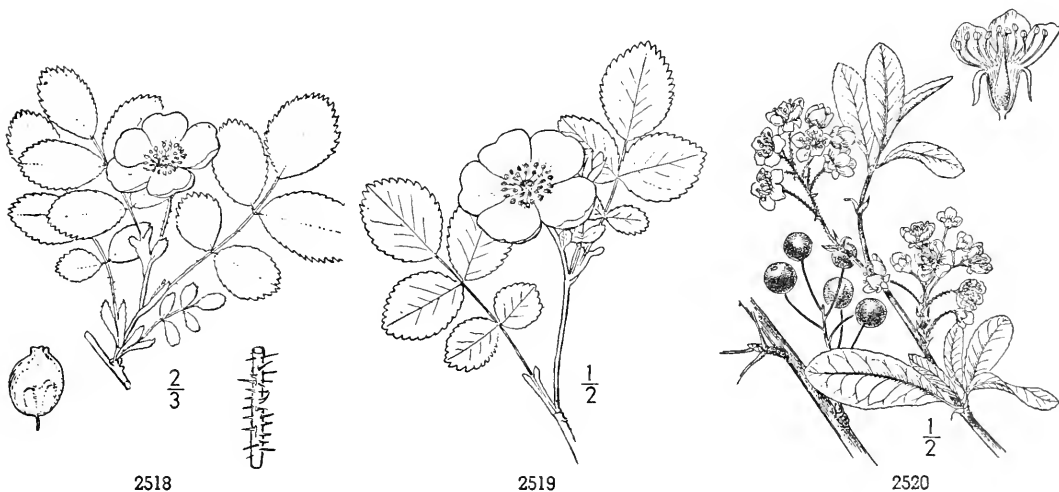
Prunus integrifolia Sarg. Man. Trees N. Amer. 531. f. 441. 1905. Not Walp.

Cerasus Lyonii Eastw. Occ. Papers Calif. Acad. 9: 54. 1905.

Laurocerasus Lyonii Britt. in Britt. & Shafer, N. Amer. Trees 512. 1908.

Prunus Lyonii Sarg. Pl. Wilson. 74. 1911.

Trees, 5-15 m. high, bark dark gray-brown becoming fissured. Leaves evergreen, coriaceous, oblong-ovate to lanceolate-ovate, acute to acuminate, 3-8 cm. long, commonly entire but some-



2518. *Rosa gymnocarpa*

2519. *Rosa Bridgesii*

2520. *Prunus emarginata*



2521. *Prunus subcordata*
2522. *Prunus Fremontii*
2523. *Prunus Andersonii*

2524. *Prunus fasciculata*
2525. *Prunus demissa*

2526. *Prunus ilicifolia*
2527. *Prunus Lyonii*
2528. *Osmaronia cerasiformis*

times with a few spinose teeth, glabrous; drupes a little larger than in the preceding species, blackish purple when ripe.

Canyon slopes, Upper Sonoran Zone; Santa Cruz, Santa Catalina, and San Clemente Islands, southern California. Type locality: Santa Catalina Island.

These two species of evergreen cherries are popular ornamentals, and remain distinct under cultivation, but they are closely related and some botanists prefer calling the latter a variety.

5. OSMARÒNIA Greene. Pittonia 2: 191. 1891.

Shrubs, with the characteristic bitter bark of *Prunus*. Leaves simple, entire, deciduous, the stipules small, early deciduous. Flowers polygamo-dioecious, white and fragrant, in nodding racemes terminating leafy branchlets of the season. Hypanthium turbinate-campanulate, deciduous. Sepals and petals 5. Staminate flowers with spreading petals; stamens 15 in 3 series, 10 inserted with the petals and 5 inserted lower down on the disk lining the hypanthium. Pistillate flowers with smaller erect petals; stamens present but abortive; pistils 5, simple, free and distinct, glabrous; styles short, lateral, jointed at base; ovules 2 to each ovary, pendulous. Fruit consisting of 1-5 drupes, with a thin pulpy exocarp and a bony endocarp. Seed solitary; cotyledons convolute. [Name consisting of the Greek adjective meaning fragrant, prefixed to the generic name *Aronia*.]

A monotypic and somewhat anomalous genus peculiar to the Pacific Coast.

1. *Osmaronia cerasifórmis* (Torr. & Gray) Greene. Oso Berry. Fig. 2528.

Nuttallia cerasiformis Torr. & Gray ex Hook. & Arn. Bot. Beechey 336. 1838.

Exochordia Davidiana Baillon, Adansonia 9: 149. 1869.

Osmaronia cerasiformis Greene, Pittonia 2: 191. 1891.

Shrub or small tree, 1-5 m. high, the bark smooth, the branches mostly erect. Leaves oblong to oblanceolate, 5-10 cm. long, entire, thin, paler and sparingly pubescent beneath when young, glabrate in age; raceme 3-10 cm. long, nodding, bracts and bractlets membranaceous, deciduous; hypanthium about 5 mm. wide and as deep; sepals 3 mm. long; petals of staminate plants obovate, 5-6 mm. long, those of the pistillate smaller and narrower; fruit about 1 cm. long, black and glaucous, the exocarp fleshy, bitter.

Canyons and shaded slopes, Transition Zone; British Columbia southward west of the Cascade-Sierra Nevada Divide to Monterey and Tulare Counties, California. Type locality: Columbia River. March-April.

Family 66. MALÁCEAE.

APPLE FAMILY.

Trees and shrubs with alternate simple or pinnate leaves, the stipules free from the petiole, small and deciduous. Flowers regular, perfect, racemose, corymbose, or solitary. Hypanthium adnate to the ovary. Sepals 5. Petals 5, usually clawed. Stamens numerous or rarely few. Ovary 1-5-celled, composed of 1-5 usually united carpels; styles 1-5; ovules 1-2 in each carpel. Fruit a more or less fleshy pome, consisting of the thickened hypanthium enclosing the bony, papery, or leathery carpels. Endosperm none; cotyledons fleshy.

About 20 genera and over 500 species, of wide geographic distribution.

Leaves deciduous; carpels united and coalescent with the fleshy hypanthium.

Leaves pinnate.

Leaves simple, entire, toothed or lobed.

Mature carpels papery or leathery.

Cavities of the ovary and fruit as many as the styles, 2-ovuled and 2-seeded. 1. *Sorbus*.

Cavities of the ovary 2-ovuled and as many as the styles, but in fruit each becoming divided into two. 2. *Malus*.

Petals oblong, ascending. 3. *Amelanchier*.

Petals orbicular, spreading. 4. *Peraphyllum*.

Mature carpels bony, becoming separable or united 1-seeded stones. 5. *Crataegus*.

Leaves evergreen; carpels 2, partly free and separating, becoming thin and papery, enclosed in the fleshy hypanthium. 6. *Heteromeles*.

1. SÓRBUS [Tourn.] L. Sp. Pl. 477. 1753.

Trees or shrubs, with alternate pinnate deciduous leaves, serrate leaflets, and deciduous stipules. Flowers perfect, regular in terminal compound cymes. Hypanthium urn-shaped. Petals 5, white, spreading, short-clawed. Stamens numerous. Ovary inferior; styles usually 3, distinct; stigma truncate; ovules 2 in each cell. Fruit a small red berry-like pome, the carpels papery. [The ancient Latin name for the pear or service-tree.]

A genus of about 10 species, native of the northern hemisphere; 4 are in North America. Type species, *Sorbus domestica* L.

Leaves serrate only toward the apex; fruit glaucous.

Leaves serrate to near the base; fruit not glaucous.

1. *S. occidentalis*.

2. *S. sitchensis*.

1. *Sorbus occidentalis* (S. Wats.) Greene. Western Mountain Ash or Rowan. Fig. 2529.

Pyrus occidentalis S. Wats. Proc. Amer. Acad. 23: 263. 1888.

Sorbus occidentalis Greene, Fl. Fran. 54. 1891.

Low shrub about 1 m. high, the young branches pubescent. Leaves bearing 7–11 leaflets, the rachis and petiole sparsely pubescent; leaflets 2–4 cm. long, oblong, obtuse, serrate only near the apex, sometimes entire, dull on the upper surface; cyme 4–10 cm. broad, its branches pubescent; petals about 4 mm. long; fruit globose, 5–6 mm. in diameter, purplish red and glaucous.

Alpine slopes, Hudsonian Zone; British Columbia to Oregon in the Cascade and Olympic Mountains. Type locality: Cascade Mountains, latitude 49°. June–Aug.

2. *Sorbus sitchensis* M. Roem. Sitka Mountain Ash or Rowan. Fig. 2530.

Sorbus sitchensis M. Roem. Fam. Nat. Syn. 3: 139. 1847.

Pyrus sitchensis Piper, Mazama 2: 107. 1901.

Sorbus cascadiensis G. N. Jones, Univ. Wash. Pub. Biol. 7: 174. 1938.

Shrub 2–5 m. high with smooth bark, the young branches pubescent. Leaves bearing 9–13 leaflets, the rachis and petioles pubescent; leaflets linear to oblong-lanceolate, acuminate to acute, sharply serrate to near the base, glabrate, shining above; fruit ellipsoid, coral red, 7–8 mm. long.

Mountain slopes, Transition Zone; Alaska to western Montana, and the Cascade Mountains to Crater Lake, Oregon. Type locality: Sitka, Alaska. May–July.

Sorbus sitchensis subsp. *californica* (Greene) Abrams. (*Sorbus californica* Greene, Pittonia 4: 131. 1900. *Pyrus sitchensis* var. *californica* Smiley, Univ. Calif. Pub. Bot. 9: 233. 1921. *Sorbus sitchensis* var. *densa* Jepson, Man. Fl. Pl. Calif. 508. 1925.) Leaflets mostly oblong or oblong-lanceolate, obtuse or acutish, otherwise like the type and intergrading with it. Siskiyou Mountains south in the Sierra Nevada to Mariposa County, California, and western Nevada.

2. *MĀLUS* [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Trees or shrubs, with alternate, toothed or lobed leaves, and showy white or pink flowers in simple terminal cymes. Hypanthium urn-shaped, open, not closed by a cushion. Sepals 5. Petals 5, rounded, clawed. Styles 2–5 (usually 5), united at the base; ovules 2 in each cell; carpels papery or leathery. Fruit a pome, usually depressed-globose and hollowed at the base, its flesh not containing grit-cells. [Greek, apple.]

A genus of about 15 species, natives of the north temperate zone, six of which are in North America. Type species, *Pyrus Malus* L.

1. *Malus fúscā* (Raf.) Schneider. Oregon Crab-apple. Fig. 2531.

Pyrus fusca Raf. Med. Fl. 2: 254. 1830.

Pyrus diversifolia Bong. Mém. Acad. St.-Pétersb. VI. 2: 133. 1832.

Pyrus rivularis Dougl. ex Hook. Fl. Bor. Amer. 1: 203. pl. 68. 1833.

Malus rivularis M. Roem. Fam. Nat. Syn. 3: 215. 1847.

Malus diversifolia M. Roem. Fam. Nat. Syn. 3: 215. 1847.

Malus fusca Schneider, Handb. Laubholz. 1: 723. 1906.

Small tree 5–10 m. high, the branches somewhat thorny. Leaves 2–4 cm. long, ovate-lanceolate, acute or acuminate, occasionally 3-lobed, serrate, darker green and sparsely pubescent above, pale and pubescent or tomentose beneath; inflorescence a simple cyme, the pedicels and hypanthium tomentose; petals white, 8–10 mm. long, suborbicular; fruit about 15 mm. long, oblong, depressed at both ends, purplish.

Moist open woods, Humid Transition Zone; Aleutian Islands, coast region of Alaska, and British Columbia, and west of the Cascade Mountains of Washington and Oregon, reaching its southern limit in Sonoma and Plumas Counties, California. Type locality: Not given. April–June.

Malus fusca var. *levipes* (Nutt.) Schneider, Handb. Laubholz. 1: 724. 1906. Leaves usually less pubescent, sometimes glabrous; pedicels and hypanthium glabrous. This is the more common form in the Willamette Valley and along the western slopes of the Cascade Mountains. The typical species is the common form nearer the coast.

3. *AMELÁNCHIER* Medic. Phil. Bot. 1: 155. 1789.

Shrubs or small trees with simple deciduous leaves and unarmed branches. Flowers racemose or rarely solitary, white. Hypanthium campanulate, more or less adnate to the ovary. Sepals 5, narrow, persistent and usually reflexed. Petals 5, ascending. Stamens many; filaments subulate. Styles 2–5, connate, pubescent at the base. Ovary wholly or partly inferior, the cells becoming twice as many as the styles by false partitions intruding from the back. Ovules solitary in each cell, erect. Fruit a berry-like pome, 4–10-celled. [The Savoy name of the Medlar.]

A genus of about 25 species, natives of the north temperate zone; about twenty are in North America. Type species, *Mespilus Amelanchier* L.

Top of ovary and leaves glabrous.

Styles 3–5; petals 10–15 mm. long.

Leaves truncate or retuse, rather coarsely crenate-serrate to near the base; inflorescence glabrous.

1. *A. glabra*.

Leaves ovate to oblong-ovate, obtuse to acute, sharply serrate; inflorescence usually sparsely villous-tomentose.

2. *A. Cusickii*.

Styles 2 or 3; petals 5 or 6 mm. long.

3. *A. Covillei*.

Top of ovary and leaves, at least when young, pubescent.

Styles 4 or 5; fruit dark purple at maturity.

Leaves floccose-tomentose beneath; petals 12–15 mm. long.

Leaves tomentulose beneath; petals 7–10 mm. long.

Styles 2 or 3; fruit reddish or orange at maturity; leaves pale.

Leaves coarsely toothed to below the middle.

Leaves entire or finely toothed toward the apex, often mucronate.

4. *A. florida*.

5. *A. gracilis*.

6. *A. utahensis*.

7. *A. pallida*.

1. *Amelanchier glabra* Greene. Smooth or Glabrous Service-berry. Fig. 2532.

Amelanchier glabra Greene, Fl. Fran. 52. 1891.

Amelanchier basalticola Piper in Piper & Beattie, Fl. Palouse Reg. 100. 1901.

Shrub 1–2 m. high, with reddish-brown twigs, the whole plant glabrous or sometimes the sepals more or less villous on the inner surface. Leaves suborbicular to broadly oblong, 2–3 cm. long, truncate to retuse at apex, obtuse to subcordate at base, green above, paler beneath, rather coarsely crenate-serrate to near the base; petals oblong-spatulate, 10–15 mm. long, rarely longer; sepals triangular-subulate, equaling the hypanthium; fruit dark purple.

Borders of woods, and along streams, Canadian Zone; eastern Washington and Idaho to the Sierra Nevada, California. Type locality: in the Donner Lake region, Sierra Nevada, California. April–June.

2. *Amelanchier Cusickii* Fernald. Cusick's Service-berry. Fig. 2533.

Amelanchier Cusickii Fernald, Erythra 7: 121. 1899.

Low shrub 1–3 m. high, with red-brown slender erect branchlets. Leaves ovate to ovate-elliptic, acute or acutish at apex, obtuse or rounded at base, 2–3.5 cm. long, sharply serrate to near the base, bright green above; raceme short, 3–6-flowered; hypanthium glabrous; sepals subulate, glabrous without, hairy within; petals oblong to oblong-oblancheolate, 10–15 mm. long; fruit dark purple.

Stream banks and bluffs, Arid Transition and Canadian Zones; Blue Mountains of southeastern Washington to the Klamath region, southern Oregon. Type locality: stony hills, Union County, Oregon. April–May.

3. *Amelanchier Covillei* Standley. Coville's Service-berry. Fig. 2534.

Amelanchier Covillei Standley, Proc. Biol. Soc. Wash. 27: 198. 1914.

Amelanchier alnifolia var. *Covillei* Jepson, Man. Fl. Pl. Calif. 510. 1925.

Shrub 1–2 m. high, with stout brownish-red glabrous branches. Leaves 1–2 cm. long, oblong-oval or rarely obovate-orbicular, rounded or usually pointed at apex, rounded or broadly cuneate at base, rather finely serrate to near the base, glabrous, firm, pale green and somewhat glaucous; racemes short, rather densely few-flowered, glabrous; hypanthium glabrous; sepals triangular-subulate, 2.5–3 mm. long, reflexed; petals 5–6 mm. long, obovate-oblong.

Canyons of desert mountains, Upper Sonoran Zone; Panamint Mountains, California, to southern Nevada and northern Arizona. Type locality: Cottonwood Canyon, Panamint Mountains, California. April–May.

4. *Amelanchier florida* Lindl. Pacific Service-berry. Fig. 2535.

Amelanchier florida Lindl. Bot. Reg. 19: pl. 1589. 1833.

Amelanchier ovalis var. *semiintegrifolia* Hook. Fl. Bor. Amer. 1: 202. 1834.

Shrub or small tree, 2–5 m. high, with reddish-brown branchlets. Leaves broadly oblong to suborbicular, mostly 3–4 cm. long, subcordate to rounded at the base, obtuse at the apex, coarsely toothed above the middle or rarely subentire, more or less tomentose beneath, glabrous or more or less strigose above, rather thin in texture, bright green above, paler beneath; petioles, branches of the inflorescence and pedicels often villous-tomentose; petals oblanceolate-obtuse, 12–15 mm. long; ovary pubescent at the summit; fruit dark purple, glabrous or sparsely pubescent.

In open woods and clearings, mainly Humid Transition Zone; southern Alaska to the coastal region of central California; common in western Oregon and Washington, extending east to Idaho. Type locality: on the banks of the Columbia, near Fort Vancouver, Washington. March–May.

5. *Amelanchier gracilis* Heller. Slender Service-berry. Fig. 2536.

Amelanchier gracilis Heller, Muhlenbergia 2: 59. 1905.

Amelanchier siskiyouensis Schneider, Handb. Laubholz. 1: 735. 1906.

Amelanchier recurvata Abrams, Bull. Torrey Club 37: 151. fig. 1. 1910.

Shrubs 1–2.5 m. high with erect or ascending usually wand-like branches and grayish bark, the young twigs reddish purple. Leaves oblong-obovate to elliptical, 2–4 cm. long, acute to truncate, entire or slightly toothed toward the apex; racemes few-flowered; petals 10 mm. long; styles 4 or 5; ovary more or less tomentose at tip; sepals triangular-lanceolate, 2 mm. long, recurved from the base in fruit; fruit dark purple, glabrous or sparsely tomentose.

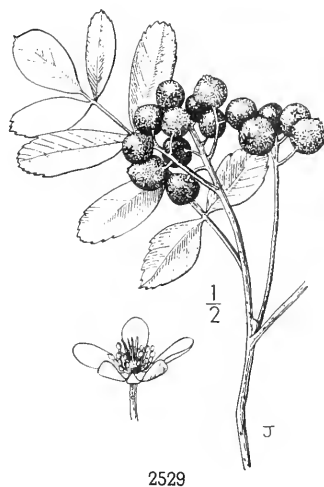
Mountain slopes, Transition and Canadian Zones; Siskiyou Mountains, Oregon, to southern California. Type locality: near Shasta Springs, Siskiyou County, California. April–May.

6. *Amelanchier utahensis* Koehne. Utah Service-berry. Fig. 2537.

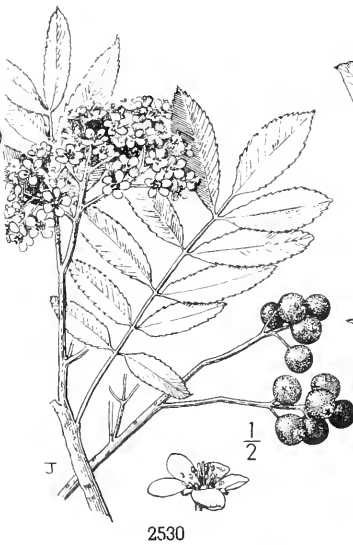
Amelanchier utahensis Koehne, Nissensch. Prog. Falk-Realgym. Berlin 95: 25. 1890.

Amelanchier alnifolia var. *utahensis* M. E. Jones, Proc. Calif. Acad. 5: 679. 1895.

Shrub 1–5 m. high with gray or brownish branches. Leaves 1–3 cm. long, elliptical to oval, acute to rounded at apex, rounded to subcordate at base, coarsely crenate-serrate to near the base, pallid, finely tomentulose and somewhat canescent on both surfaces; racemes 2–3 cm. long;



2529



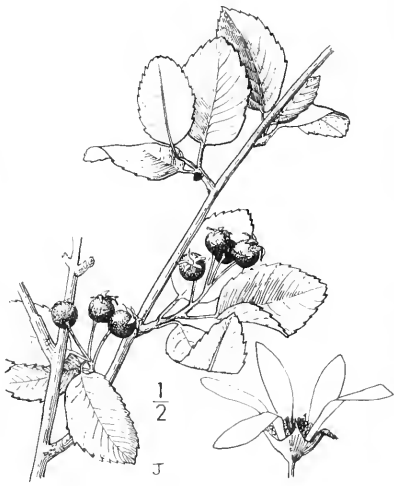
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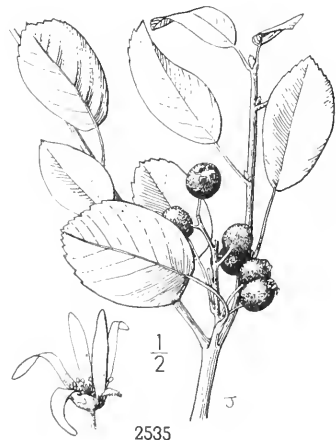
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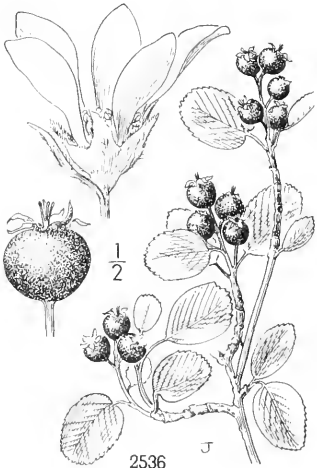
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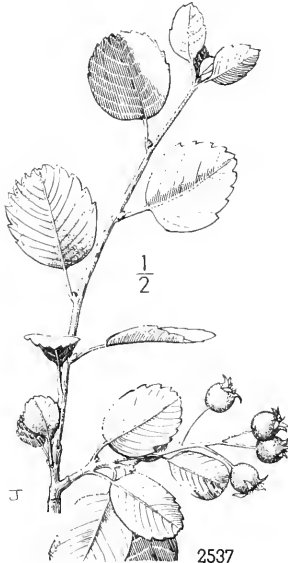
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2537

2529. *Sorbus occidentalis*
2530. *Sorbus sitchensis*
2531. *Malus fusca*

2532. *Amelanchier glabra*
2533. *Amelanchier Cusickii*
2534. *Amelanchier Covillei*

2535. *Amelanchier florida*
2536. *Amelanchier gracilis*
2537. *Amelanchier utahensis*

sepals narrowly lanceolate, short-villous on both surfaces; petals elliptical, 7 mm. long; fruit 7-8 mm. broad, puberulent, yellow or orange.

Dry hillsides, Arid Transition and Upper Sonoran Zones; eastern Washington and Oregon to Idaho and Colorado, south through the Great Basin region to the Mojave Desert, California, Arizona, and New Mexico. Type locality: Leeds, Utah. April-June.

7. *Amelanchier pallida* Greene. Pallid Service-berry. Fig. 2538.

Amelanchier pallida Greene, Fl. Fran. 53. 1891.

Amelanchier alnifolia var. *pallida* Jepson. Man. Fl. Pl. Calif. 509. 1925.

Amelanchier subintegra Greene, Pittonia 5: 109. 1903.

Shrub 2-3 m. high with mostly short rigid grayish branches, young twigs tomentose. Leaves elliptical to broadly ovate, pallid, firm, tomentulose beneath, strigose above, entire or toothed toward the apex, the teeth small; petals oblong, 8-10 mm. long, sparsely puberulent; styles normally 2 or 3; fruit reddish tardily darkening, glabrous or sparsely tomentose; fruiting sepals narrow, acuminate, more or less erect at least below.

Dry hillsides, mainly Arid Transition Zone; Siskiyou Mountains, southern Oregon, to the Cuyamaca Mountains, California, east to Nevada. Type locality: northern and northeastern California. April-June.

Amelanchier cuneata Piper, Bull. Torrey Club 27: 392. 1900. Shrub about 2 m. high, the branchlets with grayish bark, and the young twigs pubescent with somewhat appressed white hairs. Leaves 2-3 cm. long, elliptical to obovate, few-toothed toward the apex, cuneate at base, sparsely pubescent on both surfaces; racemes 10-20-flowered; hypanthium pubescent; petals 12 m. long, oblanceolate. A little-known form which has been collected only "in sagebrush land, Ellensburg, Washington."

4. *PERAPHYLLUM* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 474. 1840.

Low shrub with grayish bark. Leaves alternate, crowded at the ends of the branches, simple, entire or serrulate. Flowers appearing with the leaves, solitary or 2 or 3 together, perfect, regular. Hypanthium subglobose, adnate to the ovary. Sepals 5, persistent. Petals 5, orbicular. Ovary with 2 carpels, but 4-celled by 2 false partitions; styles 2 or 3, slender, stamens about 20. Fruit a pome, fleshy and bitter, the carpels cartilaginous. [Name Greek, meaning very leafy.]

A monotypic genus of the Great Basin region.

1. *Peraphyllum ramosissimum* Nutt. Squaw Apple. Fig. 2539.

Peraphyllum ramosissimum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 474. 1840.

Low, intricately branched shrub, 1-2 m. high. Leaves 2-4 cm. long, narrowly oblanceolate, narrowed at the base, acute at the apex, sparingly appressed-pubescent, entire or serrulate, the teeth tipped with deciduous glands; sepals triangular, reflexed; petals pale pink; fruit yellowish, 8-10 mm. thick, very bitter.

Dry hills, Upper Sonoran and Arid Transition Zones; eastern Oregon and northeastern California to southern Utah and western Colorado. Type locality: "dry hillsides near the Blue Mountains of the Oregon." April-May.

5. *CRATAEGUS* L. Sp. Pl. 475. 1753.

Shrubs or small trees, usually armed with thorns or spines. Leaves deciduous, alternate, petioled, simple, toothed and usually more or less lobed. Flowers in terminal corymbs or cymes. Hypanthium cup-shaped or campanulate, adnate to the ovary. Sepals 5, reflexed after anthesis. Petals 5, white or pink, spreading, rounded. Stamens 5-25, inserted on the margin of the hypanthium in 1-3 series; filaments filiform. Ovary inferior, 1-5-celled; styles 1-5, separate, usually surrounded at the base by tomentum; ovules usually 1 in each cell, or if 2 dissimilar. Pome small, yellow, red, or rarely blue or black, containing 1-5 bony and 1-seeded carpels. [Greek, meaning strong, from the hardness and toughness of the wood.]

About 300 species, natives of the north temperate zone of both hemispheres, extending to the tablelands of Mexico and the Andes, but most abundant in the eastern United States. Type species, *Crataegus Oxyacantha* L.

Sepals short-triangular, merely acute; fruit black.

Sepals attenuate, usually more or less glandular-toothed; fruit purple or red.

Inflorescence glabrous or glabrate.

Inflorescence densely villous.

1. *C. Douglasii*.

2. *C. columbiana*.

3. *C. Piperi*.

1. *Crataegus Douglàsii* Lindl. Douglas' Thorn-apple. Fig. 2540.

Crataegus punctata var. *brevispina* Dougl. ex Hook. Fl. Bor. Amer. 1: 201. 1833.

Crataegus Douglàsii Lindl. Bot. Reg. 21: pl. 1810. 1835.

Shrub or small tree, 5-12 m. high, armed with stout thorns 1-2 cm. long. Leaves broadly obovate, 2-7 cm. long, obtuse or acutish at apex, more or less doubly serrate above the cuneate base, those of young shoots often incisely lobed, glabrous beneath, pubescent at least on the midrib above, rather thick and firm; pedicels glabrous or sparingly hairy; corymbs usually many-flowered; hypanthium glabrous, the short-triangular sepals more or less villous toward the apex, entire; petals orbicular, 4-5 mm. long; anthers pink; fruit black, smooth.

Along streams and the edges of meadows, Humid Transition Zone; western British Columbia to central California, west of the Cascade Mountains. Type locality: vicinity of Vancouver, Washington. April-June.

2. *Crataegus columbiàna* Howell. Columbia Thorn-apple. Fig. 2541.

Crataegus columbiàna Howell, Fl. N.W. Amer. 1: 163. 1898.

A shrub or small tree 2-5 m. high, usually much branched, the thorns stout, 2-5 cm. long. Leaves cuneate-obovate, 2-5 cm. long, usually incisely 5-9-lobed, irregularly serrate above the cuneate base, the teeth often gland-tipped, sparingly pubescent above, glabrous below or sparsely hairy in the axils of the principal veins; branches of the corymb and pedicels glabrous or glabrate; flowers many; sepals long-triangular, acuminate, often glandular-serrate, very sparingly villous; fruit purple or red.

Along streams, Arid Transition Zone; southeastern British Columbia, eastern Washington and Oregon to northeastern California. Type locality: common along the Columbia River and its tributaries east of the Cascade Mountains. April-May.

3. *Crataegus Piperi* Britt. Piper's Thorn-apple. Fig. 2542.

Crataegus Piperi Britt. Torreya 1: 55. 1901.

A much branched shrub, 2-3 m. high, the thorns rather slender, 3-5 cm. long, dark brown. Leaves broadly oval, 2-4 cm. long, the teeth sharp, gland-tipped, incised and doubly serrate above the middle, merely serrate on the cuneate base, sparingly strigose on both surfaces; pedicels and hypanthium densely villous; sepals long-triangular, 4-5 mm. long, usually glandular-toothed; fruit coral-red, spherical or nearly so, about 12 mm. broad, sparingly pubescent.

Along streams and on moist slopes, Arid Transition and Upper Sonoran Zones; eastern Washington, eastern Oregon, and Idaho. Type locality: Pullman, Washington. April-May.

6. *HETERÔMELES* M. Roem. Fam. Nat. Syn. 3: 105. 1847.

An unarmed shrub or small tree, with simple coriaceous evergreen toothed leaves, and minute stipules. Flowers small, white, in terminal corymbose panicles. Hypanthium turbinate, partly adnate to the ovary. Sepals 5, persistent. Petals 5, rounded, concave, spreading. Stamens 10, in pairs opposite the sepals; filaments dilated at base and somewhat connate. Ovary 2-3-celled; ovules 2 to each cell, ascending; styles 2-3. Fruit a red ovoid berry-like pome, the fleshy hypanthium connate with the membranaceous carpels to the middle, and the thickened sepals curved over them above.

A monotypic California genus, closely related to *Photinia* of China and Japan.

1. *Heteromeles arbutifolia* (Ait.) M. Roem. Tollon, Christmas Berry. Fig. 2543.

Crataegus arbutifolia Ait. Hort. Kew. 3: 202. 1811. Not Lam. 1783.

Photinia arbutifolia Lindl. Trans. Linn. Soc. 13: 103. 1821.

Heteromeles arbutifolia M. Roem. Fam. Nat. Syn. 3: 105. 1847.

Photinia salicifolia Presl, Epimel. Bot. 204. 1849.

Heteromeles Fremontiana Decn. Nouv. Ann. Mus. Paris 10: 144. 1874.

Heteromeles salicifolia Abrams, Bull. N.Y. Bot. Gard. 6: 381. 1910.

Arborescent shrub or small tree 2-10 m. high, the young branchlets tomentulose. Leaves 5-10 cm. long, narrowly oblong to oblong-lanceolate, rather pungently and remotely serrate or dentate, coriaceous, dark green and shining above, pale beneath, glabrous or sparsely tomentulose; corymbs many-flowered, often 10-15 cm. broad, the branches sparsely tomentulose; hypanthium about 3 mm. high; sepals short, triangular; petals suborbicular, 4 mm. long; fruit broadly ovoid, 4-6 mm. in diameter, bright red.

Hillsides and canyons, at its best in deep rich soils, mainly Upper Sonoran Zone; California from Humboldt and Shasta Counties to Mariposa County, and in the Coast Ranges to northern Lower California. Type locality: Monterey, California. April-July.

Yellow-berried plants are sometimes found in the southern Coast Ranges, and on San Clemente and Santa Catalina Islands the berries are usually larger. Both of these variants have been given varietal names by some botanists.

Family 67. MIMOSACEAE.

MIMOSA FAMILY.

Herbs, shrubs, or trees, with alternate mostly compound leaves, and small regular mostly perfect flowers, in heads, spikes, or racemes. Calyx 3-6-toothed or -lobed. Corolla of as many distinct or more or less united valvate petals. Stamens as many as the petals, twice as many or numerous, distinct or monadelphous. Pistil solitary; ovary 1-celled; ovules several or numerous; style simple. Fruit a legume.

About 40 genera and 1,500 species, mostly of tropical distribution. This, and the three following families, are often united under the name *Leguminosae*.

Stamens united below into a tube.

1. *Calliandra*.

Stamens distinct or united only at the base.

Stamens numerous, at least more than 10; anthers not gland-tipped.

2. *Acacia*.

Stamens 10; anthers gland-tipped.

3. *Prosopis*.

1. CALLIÁNDRA Benth. in Hook. Journ. Bot. 2: 138. 1840.

Herbs, shrubs, or trees, with bipinnate leaves and capitate flowers, the heads peduncled, axillary or in terminal racemes. Calyx 5-toothed or 5-lobed. Petals united to about the middle into a 5-lobed funnellform or campanulate corolla. Stamens numerous, long-exserted; filaments united below into a tube; anthers small, glandular-pubescent or glabrous; pollen grains agglomerate. Style filiform; ovules many. Legume linear, usually narrowed below, flat, straight or nearly so, not pulpy within, elastically dehiscent from the apex, the valves coriaceous with raised margins. Seeds orbicular or obovate, compressed. [Name Greek, meaning beautiful stamens.]

A genus of about 150 species, natives of subtropical and tropical America, Africa, and India. Type species, *Calliandra Houstonii* (L'Her.) Benth. *Anneslia* Salisb. (1807) has priority but *Calliandra* is conserved.

1. *Calliandra eriophylla* Benth. Hairy-leaved *Calliandra*. Fig. 2544.

Calliandra eriophylla Benth. Lond. Journ. Bot. 3: 105. 1844.

Calliandra Chamaedrys Engelm. ex A. Gray, Mem. Amer. Acad. II. 4: 39. 1849.

Calliandra conferta Benth. ex A. Gray, Pl. Wright. 1: 63. 1852.

Anneslia eriophylla Britt. & Rose, N. Amer. Fl. 23: 59. 1928.

Low much branched shrub, commonly about 30 cm. high, two or more main branches usually arising from the same root, the older branches gray, the young twigs brownish with the broad striae canescent with a downwardly appressed pubescence. Stipules subulate-setaceous; pinnae 1-7 pairs; leaflets usually 5-8 pairs, oblong, 3-4 mm. long, obtuse or acutish, more or less strigose; heads racemose or axillary, few-flowered; flowers sparingly strigose, reddish purple; calyx 1-1.5 mm. long; corolla 4-6 mm. long; stamens about 2 cm. long, united at base into a short tube; legume 3-6 cm. long, about 5 mm. wide, tapering below the middle, densely short-pubescent with downwardly appressed hairs.

Rocky canyons and hillsides, Lower Sonoran Zone; Chocolate Mountains, southeastern California, to western Texas, south to Lower California and Puebla, Mexico. Type locality: Chila, Puebla, Mexico. March-May. False Mesquite.

2. ACÁCIA [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Trees or shrubs, or some species nearly herbaceous, with bipinnate leaves, the ultimate leaflets usually small and numerous, or the leaves in many exotic species modified into simple flat phyllodia. Flowers small, usually yellow, in heads or spikes. Calyx usually 4-5-toothed, or the sepals distinct. Petals usually 4 or 5, distinct or united, or wanting. Stamens many, exserted; filaments filiform, distinct; pollen grains cohering in twos to sixes. Pod linear to oval, flat or swollen, often constricted between the seeds. [Greek, meaning point or thorn, many species being thorny.]

A genus of perhaps 300 species, chiefly in subtropical regions, and most abundant in Africa and Australia. Type species, *Mimosa scorpioides* L.

1. *Acacia Gréggii* A. Gray. Gregg's Acacia, Cat-claw, Uña-de-gato. Fig. 2545.

Acacia Greggii A. Gray, Pl. Wright. 1: 65. 1852.

Senecalia Greggii Britt. & Rose, N. Amer. Fl. 23: 110. 1930.

Shrub or small tree, the grayish-brown branches usually rigid and armed with short, more or less flattened and recurved spines. Leaves with 2 or 3 pairs of pinnae, cinereous-pubescent throughout; leaflets oblong to obovate, 3-6 mm. long; spikes 3-5 cm. long, about equaling the peduncles; flowers light yellow; pods flat, 8-12 cm. long.

Desert hillsides and canyons, Lower Sonoran Zone; Colorado Desert, southern California, to western Texas, Lower California, and Sonora. Type locality: western Texas. April-June.

Acacia Farnesiàna (L.) Willd. Sp. Pl. 4: 1083. 1806. Small tree or arborescent shrub. Leaves deciduous; leaflets 3-8 pairs, glabrous, linear-oblong, 2-6 mm. long; flowers bright yellow, in globose heads on slender pubescent peduncles; pod oblong or cylindric, often thicker than wide, 3-7.5 cm. long. This Mexican and tropical American species has been collected (*Wolf*) near Otay, San Diego County, California, where it was probably introduced.

3. PROSÔPIS L. Mant. 1: 10. 1767.

Trees or shrubs often armed with axillary spines or spinescent stipules. Leaves bipinnate with 1 or 2 pairs of pinnae and usually small entire leaflets. Flowers greenish, regular, in cylindric or globose axillary pedunculate spikes. Calyx campanulate, the teeth very short and valvate. Petals 5, valvate, united below the middle or at length free, woolly on the inner side. Stamens 10, free and exserted; anthers tipped with a deciduous gland. Ovary villous; style filiform. Pod linear, compressed or nearly terete, straight, falcate or spirally coiled, coriaceous and indehiscent, usually pulpy within. Seeds numerous, ovate, compressed. [Ancient Greek name of some very different plant.]

About 10 species, natives of the warm temperate and tropical regions. Type species, *Prosopis spicigera* L.

Pods not coiled.

Pods spirally coiled.

1. *P. chilensis glandulosa*.

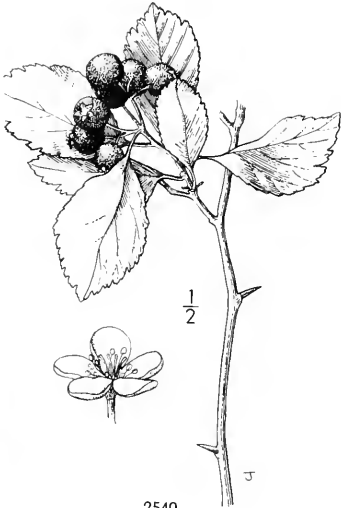
2. *P. pubescens*.



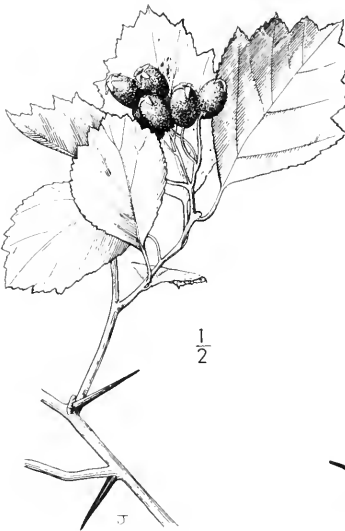
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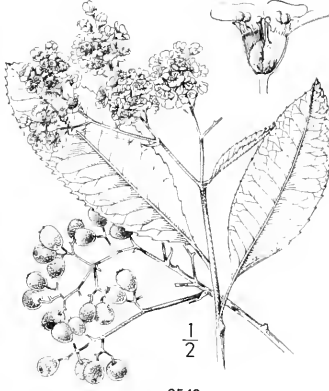
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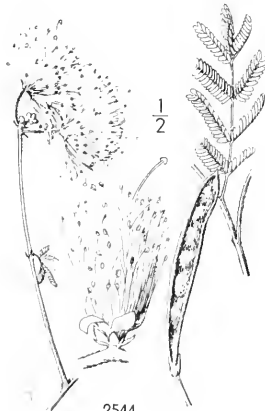
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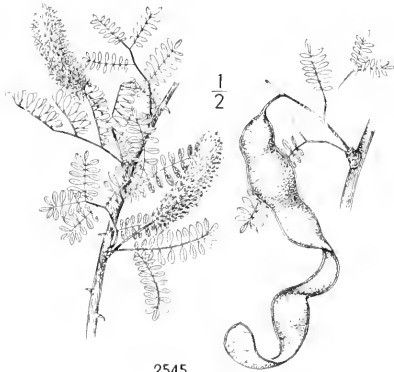
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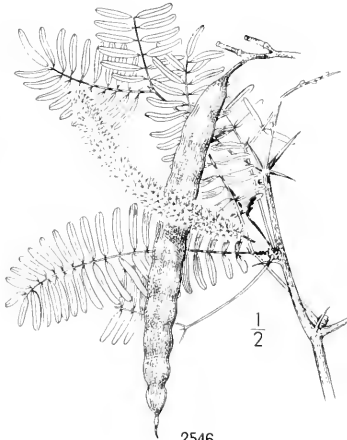
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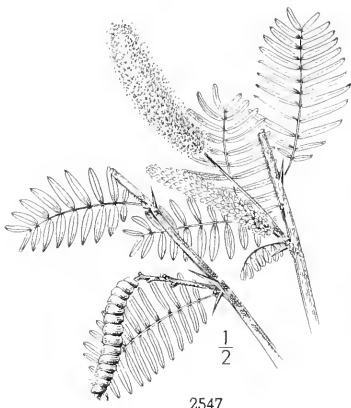


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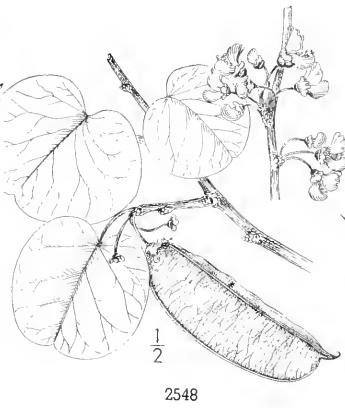
2538. *Amelanchier pallida*
2539. *Peraphyllum ramosissimum*
2540. *Crataegus Douglasii*

2541. *Crataegus columbiana*
2542. *Crataegus Piperi*
2543. *Heteromeles arbutifolia*

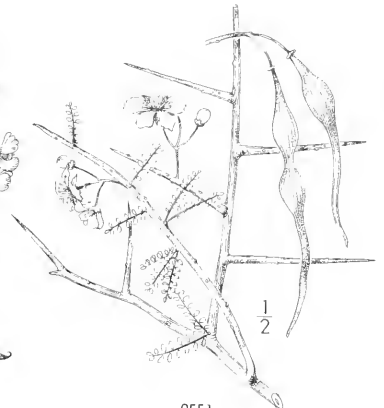
2544. *Calliandra eriophylla*
2545. *Acacia Greggii*
2546. *Prosopis chilensis*



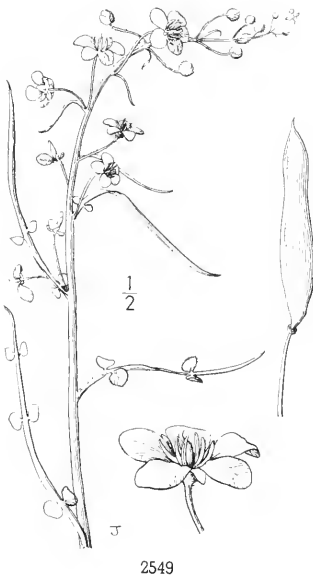
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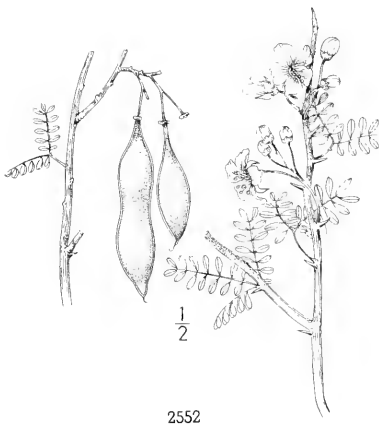
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2547. *Prosopis pubescens*
 2548. *Cercis occidentalis*
 2549. *Cassia armata*

2550. *Cassia Covessii*
 2551. *Cercidium microphyllum*

2552. *Cercidium floridum*
 2553. *Hoffmanseggia densiflora*
 2554. *Hoffmanseggia microphylla*

1. *Prosopis chilensis* subsp. *glandulosa* (Torr.) Standley. Mesquite.
Fig. 2546.

Prosopis glandulosa Torr. Ann. Lyc. N.Y. 2: 192. 1828.

Prosopis juliflora var. *glandulosa* Cockerell, Bull. N. Mex. Agr. Sta. 15: 58. 1895.

Prosopis chilensis subsp. *glandulosa* Standley, Contr. U.S. Nat. Herb. 23: 1658. 1926.

Much branched shrub or small tree, the widely spreading branches armed with axillary spines. Leaves glabrous or sparsely puberulent on the petioles and the margins of the leaflets; leaflets 8–12 pairs, linear, 12–15 mm. long; spikes 5–8 cm. long, usually densely flowered; pedicels 2 mm. long; pods straight or slightly falcate, usually only 1–3 developing, 10–15 cm. long, 10–12 mm. wide, longitudinally veiny, narrowed to a short stipe, straw-colored, sweetish when ripe.

River bottoms and washes, Lower Sonoran Zone; interior valleys and desert regions of southern California to Texas and southern Mexico. Type locality: New Mexico. April–June.

Prosopis chilensis subsp. *velutina* (Wooton) Standley, Contr. U.S. Nat. Herb. 23: 1658. 1926. (*Prosopis velutina* Wooton, Bull. Torrey Club 25: 456. 1898.) Leaflets smaller than the preceding and distinctly pubescent. Southern California to Arizona and Mexico.

2. *Prosopis pubescens* Benth. Tornillo or Screw-bean. Fig. 2547.

Prosopis pubescens Benth. Lond. Journ. Bot. 5: 82. 1846.

Prosopis Emoryi Torr. in Emory, Notes Mil. Rec. 139. 1848.

Strombocarpa pubescens A. Gray, Pl. Wright. 1: 60. 1852.

Prosopis odorata Torr. & Frem. in Frem. Second Rep. 313, in part. 1845.

Shrub or small tree, attaining 10 m. in height, the trunk 1–3 dm. in diameter, the bark brown, separating into thin flakes, the branchlets armed with stout whitish spines. Leaves deciduous; leaflets 3–7 pairs on each pinna, oblong-linear, 1 cm. long or less, pubescent; spikes 5–8 cm. long; pods tightly coiled into a spiral 3–5 cm. long.

River bottoms and washes, Lower Sonoran Zone; deserts of southern California to western Texas, Lower California, Sonora, and Chihuahua. Type locality: not definitely known. May–Aug.

Family 68. CAESALPINIACEAE.

SENNA FAMILY.

Herbs, shrubs, or trees with alternate, simple, or compound mostly stipulate leaves. Flowers usually perfect, sometimes polygamous, monoecious or dioecious, irregular or nearly regular. Calyx with 5 distinct sepals, or merely 5-toothed. Petals usually 5, imbricated, the lower pair outermost, the upper odd ones enclosed by the lateral pair. Stamens 10 or fewer, distinct or the filaments more or less united. Ovary 1-celled, with one to many ovules. Fruit a legume, usually dehiscent into 2 valves; seeds with or without endosperm.

About 90 genera and 1,000 species, mostly of tropical distribution.

Leaves simple; flowers purple, very irregular and papilionaceous-like.

1. *Cercis*.

Leaves pinnate or bipinnate; flowers yellow, only slightly irregular.

2. *Cassia*.

Leaves pinnate; sepals distinct.

3. *Cercidium*.

Leaves bipinnate; sepals united into toothed or lobed calyx.

Trees or arborescent shrubs, spinose.

4. *Hoffmanseggia*.

Herbs or low shrubs, without spines.

1. *CÉRCIS* L. Sp. Pl. 374. 1753.

Small trees or arborescent shrubs with simple leaves, and reddish-purple flowers borne in lateral fascicles on the twigs of the preceding year. Calyx broadly campanulate, slightly oblique, 5-toothed. Corolla irregular and simulating the papilionaceous; petals 5, the standard innermost and smallest, the keel petals larger than the wings. Stamens 10, distinct, declined; anthers all alike. Ovary short-stipitate; ovules many. Pod oblong or linear-oblong, flat, the upper suture margined; valves thin, reticulate-veined; seeds compressed, obovate, with endosperm. [The ancient name.]

About 7 species, natives of North America, Europe, and Asia. Type species, *Cercis Siliquastrum* L.

1. *Cercis occidentalis* Torr. Western Red-bud or Judas-tree. Fig. 2548.

Cercis occidentalis Torr. ex A. Gray, Bost. Journ. Nat. Hist. 6: 177. 1850.

Siliquastrum occidentale Greene, Man. Bot. Bay Reg. 84. 1894.

Cercis latissima Greene, Rep. Spec. Nov. 11: 111. 1912.

Cercis nephrophylla Greene, Rep. Spec. Nov. 11: 111. 1912.

Arborescent shrub or small tree, 2.5–5 m. high, twigs glabrous, bud scales more or less finely ciliate on the margins. Leaves round or round-reniform, 4–6 cm. broad, more or less deeply cordate with a narrow sinus, rounded at apex, glabrous and glossy on both surfaces, rather pale

green; petioles slender, 15–20 mm. long; pedicels 10–15 mm. long; pods 5–6 cm. long, about 15 mm. wide, very thin.

Foothill slopes, Upper Sonoran Zone; Siskiyou Mountains, south through the Coast Ranges and the Sierra Nevada to San Diego County, California, east to Utah and western Texas. Type locality: "rocky drains of the Upper Guadalupe," Texas. April–May.

2. CASSIA [Tourn.] L. Sp. Pl. 376. 1753.

Trees and shrubs or herbaceous plants, with evenly pinnate leaves, and usually yellow flowers. Calyx deeply toothed or divided into nearly equal lobes. Petals 5, nearly equal, spreading, clawed, imbricate. Stamens 10 or sometimes 5, often unequal; anthers all alike or those on the lower stamens longer, opening by terminal pores. Ovary sessile or stipitate; ovules many. Pods flat or terete, often curved, sometimes septate between the seeds. [Ancient Greek name.]

About 200 species of warm temperate and tropical regions. Type species, *Cassia fistula* L.

Leaf-rachis much prolonged beyond the last pair of leaflets and sharp-pointed; herbage finely and usually sparsely puberulent, appearing glabrous except under a lens.

1. *C. armata*.

Leaf-rachis not prolonged beyond the leaflets; herbage densely white-pubescent.

2. *C. Covesii*.

1. *Cassia armata* S. Wats. Armed Senna or Cassia. Fig. 2549.

Cassia armata S. Wats. Proc. Amer. Acad. 11: 136. 1876.

Xerocassia armata Britt. & Rose, N. Amer. Fl. 23: 246. 1930.

Low much branched shrub, 0.5–1.5 m. high, the branches pale green, striate and minutely puberulent, fistulose. Stipules none; leaves very sparse, pinnate, the rachis dilated ending in a prolonged sharp point, 5–7 cm. long; leaflets only 1–4 pairs, remote, obliquely oblong, 4–6 mm. long, nearly glabrous; racemes 5–15 cm. long, leafy-bracted; pedicels slender, 10–15 mm. long; petals broadly ovate, 8–12 mm. long, salmon-colored; pods short-stipitate, 25–40 mm. long, 4–5 mm. thick, minutely appressed-puberulent.

Dry desert washes and slopes, Lower Sonoran Zone; Mojave and Colorado Deserts, California, to central Arizona. Type locality: "Between Fort Mojave and Cajon Pass," California. April–June.

2. *Cassia Covesii* A. Gray. Coves's Cassia. Fig. 2250.

Cassia Covesii A. Gray, Proc. Amer. Acad. 7: 399. 1868.

Earleocassia Covesii Britt. & Rose, N. Amer. Fl. 23: 249. 1930.

Low suffrutescent plants, 3–6 dm. high, clothed throughout with a dense white pubescence, the stems leafy, branching at the base from a woody caudex. Stipules filiform; leaf-rachis 25–35 mm. long; leaflets 2 or 3 pairs, obliquely oblong to elliptical, 10–25 mm. long; racemes short, corymbose, the lower pedicels about 2 cm. long; petals 10–12 mm. long, oblong-obovate, yellow; pods 2–3 cm. long, straight or slightly curved.

Sandy desert washes, Lower Sonoran Zone; Chuckwalla Mountains, southern California, to Arizona. Type locality: Camp Grant, and south of Prescott, Arizona. April–Aug.

Parkinsonia aculeata L. Sp. Pl. 375. 1753. Small tree 6–9 m. high, with smooth light green bark. Petioles very short or none, subtended by stout 1–3-forked spines; pinnae 1 to several, their rachis flattened, often 20 cm. long or more; leaflets scattered, sometimes very scanty, 4–10 mm. long; flowers racemose; petals 10–15 mm. long, the blades rounded or oval; pods 5–10 cm. long, constricted between the seeds, and acuminate at both ends. In sandy alluvial soils, Lower Sonoran and Tropical Zones; southwestern Arizona to Florida, and widely distributed in the tropics. Probably not native in California, but widely planted in the Colorado Desert region of Riverside and Imperial Counties, and sometimes growing spontaneously. Palo Verde.

3. CERCIDIUM Tulasne, Arch. Mus. Paris 4: 133. 1844.

Shrubs or small trees with smooth bark, the branches often armed with spines. Leaves bipinnate, distinct from the spines, the rachis of the pinnae terete. Flowers in short corymbose clusters. Calyx-lobes short, valvate. Petals 5, yellow, with broad imbricated blades. Stamens 10, slightly declined, the filaments pubescent near the base. Pods flattened or torose, the seeds several. [Name Greek, a weaver's instrument, which the shape of the pod suggests.]

An American genus of 8 to 10 species. Type species, *Cercidium spinosum* Tulasne.

Branches spine-tipped but not armed with spines; leaflets minute, 1–2 mm. long; pods torose.

1. *C. microphyllum*.

Branches armed with short spines; leaflets 4–7 mm. long; pods flattened.

2. *C. floridum*.

1. *Cercidium microphyllum* (Torr.) Rose & Johnston. Small-leaved Palo Verde. Fig. 2551.

Parkinsonia microphylla Torr. Pacif. R. Rep. 4: 82. 1857.

Cercidium microphyllum Rose & Johnston, Contr. Gray Herb. 70: 66. 1924.

Cercidiopsis microphylla Britt. & Rose, N. Amer. Fl. 23: 306. 1930.

Arborescent shrub or small tree, 2–8 m. high, with smooth light gray-green bark, the branchlets spine-tipped but without lateral spines. Leaves without a primary rachis, the two sessile pinnae 1–3 cm. long; leaflets 4–8 pairs, elliptic, 1–2 mm. long; pedicels 5–15 mm. long; petals yellow, 5–7 mm. long; pods 4–6 cm. long, scarcely flattened, 1–4-seeded, much restricted between the seeds, ending in a long acuminate beak, narrowed to a stipe at the base.

Desert regions, Lower Sonoran Zone; Whipple Mountains, California, to Arizona and Sonora. Type locality: diluvial banks, Yuma, Arizona. March–May. Horse Bean.

2. *Cercidium floridum* Benth. Border Palo Verde. Fig. 2552.

Cercidium floridum Benth. in A. Gray, Pl. Wright. 1: 58. 1858.

Parkinsonia florida S. Wats. Proc. Amer. Acad. 11: 135. 1876.

Parkinsonia Torreyana S. Wats. Proc. Amer. Acad. 11: 135. 1876.

Cercidium Torreyana Sarg. Gard. & Forest 2: 388. 1889.

Small tree, 4–6 m. high, with smooth pale gray-green bark, branchlets often armed with short simple spines. Leaves of short duration, leaving the plants leafless most of the year; primary rachis 1–2 cm. long, bearing 2 pinnae at the summit; leaflets mostly 2 or 3 pairs, oblong-oblancoate, 4–7 mm. long, these and the rachis sparsely pubescent; petals with rounded blades about 7 mm. broad; pods flattened, 2–6 cm. long, usually about 1 cm. wide, acute or acuminate at both ends, 1 to several-seeded, and more or less constricted between the seeds.

Desert washes, Lower Sonoran Zone; Colorado Desert, southern California, to Arizona, Lower California, and Sonora. Type locality: originally collected by Coulter on his trip from Monterey to Yuma. April–June.

4. *HOFFMANSÉGGIA* Cav. Ic. 4: 63. *pl.* 392, 393. 1797.

Herbs or low shrubs, with glandular-punctate bipinnate leaves and small stipules. Flowers in terminal or lateral racemes. Calyx deeply 5-parted into nearly equal lobes. Petals 5, nearly equal, yellow. Stamens 10, distinct, slightly declined; filaments often glandular below; anthers similar, longitudinally dehiscent. Ovary sessile or nearly so; ovules many. Pod flat, linear to ovate, 2-valved. [Name in honor of Joh. Centurius Graf Hoffmansegge, a Portuguese botanist.]

About 20 species, natives of America and South Africa. Type species, *Hoffmanseggia falcaria* Cav.

Leaves with 5–9 pinnae; perennial herb.

1. *H. densiflora*.

Leaves with 3 pinnae, on the uppermost leaves the 2 lateral pinnae reduced or sometimes wanting; shrub.

2. *H. microphylla*.

1. *Hoffmanseggia densiflora* Benth. Camote de Raton. Fig. 2553.

Hoffmanseggia densiflora Benth. ex A. Gray, Smiths. Contr. 3: 55. 1852.

Hoffmanseggia stricta Benth. ex A. Gray, op. cit. 56.

Stems several from a deep-seated perennial root, puberulent with minute retrorsely incurved hairs. Leaves 5–12 cm. long, with 5–9 pinnae, the rachises with scattered stout-stipitate glands; pinnae 5–20 mm. long; leaflets 10–20, oblong, 4–6 mm. long, sparsely puberulent with upwardly incurved hairs; racemes 5–15 cm. long, the short pedicels and calyx tomentose and stipitate-glandular; calyx-lobes similar, 7–8 mm. long; petals about 1 cm. long, the blade broadly oblong or obovoid, abruptly narrowed to the stipitate-glandular claw; stamens glandular toward the base; pods 15–40 mm. long, slightly curved, with scattered short-stipitate glands.

Alkaline soils, Lower Sonoran Zone; upper San Joaquin Valley and Inyo County, California, southward through the desert region to Lower California, eastward to Texas and Mexico; closely related to the Chilean *H. falcaria* Cav. Type locality: valley of the Pecos, Texas. April–June.

2. *Hoffmanseggia microphylla* Torr. Small-leaved Hoffmanseggia. Fig. 2554.

Hoffmanseggia microphylla Torr. Bot. Mex. Bound. 58. 1859.

Shrub 0.5–2 m. high, with slender broom-like branches. Leaves sparse, with 3 pinnae, scantily short-pubescent, not at all glandular; petioles 10–15 mm. long; lateral pinnae 5–10 mm. long, the terminal 15–40 mm. long; leaflets oblong, 3–5 mm. long; racemes slender, 5–15 cm. long, pubescent with spreading hairs, the bractlets and sometimes the calyx-lobes stipitate-glandular on the margins; petals 6–7 mm. long, the blade rounded, the claw rather short, stipitate-glandular on the back; filaments glandular-stipitate; pods 15–25 mm. long, rather densely clothed with almost sessile glands.

Sandy soils, Lower Sonoran Zone; Colorado Desert, southern California, to Lower California. Type locality: "Sandy desert of the Colorado, California." Feb.–June.

Family 69. FABACEAE.

PEA FAMILY.

Herbs or woody plants with alternate usually compound stipulate leaves. Flowers irregular and papilionaceous, perfect or sometimes polygamo-dioecious. Hypanthium obsolete or obscure. Calyx 4–5-toothed or -cleft, the divisions equal or unequal, sometimes 2-lipped. Petals on the receptacle or on the rim of the very short hypanthium, usually 5, reduced to 1 in *Amorpha*, the upper one (standard or banner) enclosing the two lateral ones (wings) in the bud, and these in turn enclosing the two lower (keel). Stamens usually 10, separate or generally with their filaments more or less united and diadelphous or monadelphous. Pistil 1, simple; ovary superior, 1-celled or sometimes 2-celled by the intrusion of the sutures; ovules 1 to many, anatropous or amphitropous. Fruit a legume, or rarely a loment, 1- to many-seeded,

dehiscent by two valves or indehiscent. Seeds generally without endosperm; cotyledons thick.

A family of over 300 genera and about 5,000 species, widely distributed in mostly temperate and tropical regions.

Stamens 10, all distinct.

Tribe I. PODALYRIEAE.

Stamens united and monadelphous or diadelphous.

Leaves not tendril-bearing.

Pod not a loment, 2-valved or indehiscent.

Stamens 10 and monadelphous; anthers of 2 kinds.

Tribe II. GENISTEAE.

Stamens 10 and diadelphous, or (*Petalostemon*) 5 and monadelphous; anthers all alike.

Leaflets denticulate, 3, rarely 4 or 5.

Tribe III. TRIFOLIEAE.

Leaflets entire, varying from 1 to many.

Plants not glandular-dotted, except *Glycyrrhiza*, which has many-seeded pods.

Flowers umbellate or solitary.

Tribe IV. LOTEAE.

Flowers racemose; leaves pinnately several to many-foliolate.

Tribe VI. GALEGEAE.

Plants glandular-dotted; pods indehiscent, 1-2-seeded.

Tribe V. PSORALEAE.

Pod a loment, that is, a legume which is contracted between the seeds, breaking apart at the constrictions when ripe into 1-seeded joints.

Tribe VII. HEDYSAREAE.

Leaves pinnate, the rachis terminating in a simple or branched tendril (tendrils rudimentary or wanting in *Vicia faba*).

Tribe VIII. VICIEAE.

Tribe I. PODALYRIEAE.

Herbs; stipules conspicuous; flowers yellow, racemose.

1. *Thermopsis*.

Spinescent shrubs; stipules none; flowers purple, solitary.

2. *Pickeringia*.

Tribe II. GENISTEAE.

Leaves palmately 7-11-foliolate; seeds estrophiolate.

3. *Lupinus*.

Leaves 1-3-foliolate or reduced to pungent petioles; seeds strophilolate.

Leaves phyllodial, reduced to pungent petioles.

4. *Ulex*.

Leaves 1-3-foliolate, not pungent.

5. *Cytisus*.

Tribe III. TRIFOLIEAE.

Leaves pinnately 3-foliolate, the terminal leaflet distinctly petiolulate; flowers in racemes or spikes; corolla deciduous after anthesis.

Style subulate; pod coiled or curved.

6. *Medicago*.

Style filiform; pod ovoid, straight, coriaceous.

7. *Melilotus*.

Leaves palmately 3-foliolate; flowers in a head or rarely in a short spike; corolla withering-persistent; pod minute, 1-2-seeded, membranous.

8. *Trifolium*.

Tribe IV. LOTEAE.

Flowers umbellate or solitary; stipules herbaceous, membranous or gland-like.

9. *Hosackia*.

Flowers umbellate (in ours); leaflets (in ours) 3, the lowest two sessile and simulating stipules.

10. *Lotus*.

Tribe V. PSORALEAE.

Stamens 10, diadelphous, sometimes only 9 present in *Dalea*.

Petals 5.

Corolla truly papilionaceous, free from the stamens; leaves mostly palmately 3-5-foliolate, sometimes pinnately 3-foliolate; heavy-scented herbs.

11. *Psoralea*.

Corolla not truly papilionaceous; 4 of the petals attached to the staminal tube near its middle; shrubs or herbs.

13. *Dalea*.

Petal 1; stamens monadelphous at base; shrubs; leaves pinnately many-foliolate.

12. *Amorpha*.

Stamens 5; the cleft staminal tube bearing 4 of the petals at its summit.

14. *Petalostemon*.

Tribe VI. GALEGEAE.

Trees with odd-pinnate leaves and often spines; flowers racemose.

Pods flattened, wing-margined on the upper suture; introduced tree.

15. *Robinia*.

Pods but little flattened, not wing-margined; native of the desert regions.

16. *Olneya*.

Herbs or suffrutescent plants.

Pods not prickly.

Leaves even-pinnate; standard petal broad.

17. *Sesbania*.

Leaves odd-pinnate; standard petal narrow.

Keel petals not produced into a beak.

18. *Astragalus*.

Keel petals produced into a beak.

19. *Oxytropis*.

Pods prickly; plants glandular-dotted.

20. *Glycyrrhiza*.

Tribe VII. HEDYSAREAE.

Herbs, not spinescent; leaves odd-pinnate.

Flowers in pedunculate heads or umbels; pods (in ours) 4-angled.

21. *Coronilla*.

Flowers in racemes; pods compressed.

22. *Hedysarum*.

Low shrubs with axillary spines; leaves simple.

23. *Alhagi*.

Tribe VIII. VICIEAE.

Styles not flattened, villous all around at the apex.

24. *Vicia*.

Styles flattened towards the apex, villous on the inner side.

25. *Lathyrus*.

1. THERMÓPSIS R. Br. in Ait. Hort. Kew. ed. 2. 3: 3. 1811.

Stout perennial herbs with sheathing scales at base, alternate 3-foliolate leaves, and

usually large foliaceous stipules. Flowers large, yellow or purple, in terminal racemes. Calyx campanulate, the teeth equal or the two upper ones united. Standard nearly orbicular, equaling the oblong wings, the keel nearly straight. Stamens 10, distinct. Ovary sessile or short-stipitate; ovules many; style incurved; stigma terminal, small. Pod linear or oblong, usually flat, straight or incurved. [Name Greek, meaning lupine-like.]

About 20 species, natives of North America and northern and eastern Asia. Type species, *Thermopsis lanceolata* (Willd.) R. Br.

Stems glabrous or nearly so.

Leaves ascending, the leaflets oblong-lanceolate; raceme dense.

1. *T. montana*.

Leaves spreading, the leaflets elliptic-oblong to obovate; raceme often loose.

2. *T. gracilis*.

Stems villous-tomentose or silky.

Herbage more or less densely tomentose with spreading or matted hairs.

3. *T. macrophylla*.

Herbage silvery-strigose.

4. *T. argentata*.

1. *Thermopsis montana* Nutt. Rocky Mountain Thermopsis or False Lupine. Fig. 2555.

Thermopsis montana Nutt. in Torr. & Gray, Fl. N. Amer. 1: 388. 1840.

Thermopsis stricta Greene, Pl. Baker. 3: 34. 1901.

Thermopsis angustata Greene, Pl. Baker, loc. cit.

Stems usually stout, 4–7 dm. high, simple or branched above, glabrous or nearly so. Stipules broadly lanceolate to linear-lanceolate, 2–5 cm. long; leaflets linear-lanceolate to oblanceolate, 3–5 cm. long, glabrous above, sparsely pubescent beneath; racemes rather loosely flowered, 5–20 cm. long; calyx-teeth much shorter than the tube, triangular-subulate; pods erect, straight, 4–6 cm. long, 10–12-seeded.

Meadows, Transition and Canadian Zones; eastern Washington and Montana to eastern Oregon, Nevada, Utah, and Colorado. Type locality: "high valleys of the Rocky Mountains, in bushy places by streams near the line of Upper California." May–July. Golden Pea.

2. *Thermopsis gracilis* Howell. Slender Thermopsis or False Lupine. Fig. 2556.

Thermopsis gracilis Howell, Erythea 1: 109. 1893.

Thermopsis montana ovata Robinson, Contr. U.S. Nat. Herb. 11: 349. 1906.

Thermopsis venosa Eastw. Bull. Torrey Club 32: 198. 1905.

Stems stout, 5–10 dm. high, glabrous or nearly so and somewhat glaucous, slightly branched above. Stipules ovate to lanceolate, 2–5 cm. long; leaflets oval to obovate, mostly obtuse, 3–7 cm. long, glabrous above, somewhat pubescent beneath; raceme rather loosely flowered, 6–12 cm. long; calyx-teeth triangular, shorter than the tube; standard much shorter than the wings and keel; pods straight and erect in fruit.

Meadows, Transition Zone; British Columbia and western Montana to the Siskiyou Mountains, and Humboldt County, California. Type locality: mountains of southwestern Oregon from the sources of the Willamette River to northern California. April–July.

3. *Thermopsis macrophylla* Hook. & Arn. California Thermopsis or False Lupine. Fig. 2557.

Thermopsis macrophylla Hook. & Arn. Bot. Beechey 329. 1836.

Thermopsis californica S. Wats. Proc. Amer. Acad. 11: 126. 1876.

Thermopsis robusta Howell, Erythea 1: 109. 1893.

Thermopsis velutina Greene, Erythea 3: 19. 1895.

Stems usually stout, 4–8 dm. high, more or less villous-tomentose with spreading hairs. Stipules ovate to ovate-lanceolate, 2–4 cm. long; leaflets 3–6 cm. long, obovate to oblanceolate, rounded or obtuse at the apex, usually rather sparsely villous-tomentose on both surfaces; raceme rather dense, 6–15 cm. long; calyx-teeth triangular-lanceolate, shorter than the tube; standard nearly as long as the wings and keel; pod straight, erect, 2–5-seeded.

Wooded slopes or meadows, mainly Transition Zone; southern Oregon to southern California. Type locality: California Coast Ranges. April–June.

4. *Thermopsis argentata* Greene. Silvery Thermopsis or False Lupine. Fig. 2558.

Thermopsis argentata Greene, Erythea 3: 18. 1895.

Stems rather slender, 3–6 dm. high, the whole plant especially when young silvery-canescens with a dense minute silky pubescence. Stipules 2–4 cm. long, broadly to narrowly lanceolate; leaflets of the lower leaves narrowly cuneate-obovate, 3–5 cm. long, those of the upper sometimes narrower and acute; racemes 8–12 cm. long, rather loosely flowered; calyx-teeth triangular-subulate, about equaling the tube; wings and keel longer than the standard; pods erect, about 4 cm. long, silky-pubescent, 5–8-seeded.

Moist soils, Transition Zone; northeastern California in Modoc and Shasta Counties; specimens also from Mount Pinos, Ventura County, seem to belong here. Type locality: Forestdale, Modoc County, California. May–July.

2. PICKERINGIA Nutt. in Torr. & Gray, Fl. N. Amer. 1: 389. 1840.

Shrub with smooth green bark and stiff spine-tipped branches. Leaves usually sparse, giving a broom-like appearance to the plant, small, 1–3-foliate; stipules none. Flowers

solitary, subsessile, showy, purple. Calyx campanulate, repandly 5-toothed. Petals equal in length; standard orbicular, with reflexed sides; keel petals distinct, oblong, obtuse. Stamens with distinct filaments. Pod linear, straight, compressed, several-seeded. [Name in honor of Charles Pickering, of the Wilkes Exploring Expedition.]

A monotypic California genus.

1. *Pickeringia montana* Nutt. Stingaree-bush, Chaparral Pea. Fig. 2559.

Pickeringia montana Nutt. in Torr. & Gray, Fl. N. Amer. 1: 389. 1840.

Xylothermia montana Greene, Pittonia 2: 188. 1891.

Shrub with stiff widely spreading branches, 1–3 m. high, the branchlets spinescent, sparsely puberulent or glabrous, olive-green. Leaves rather crowded, glabrous or nearly so; leaflets oblanceolate to obovate, 8–15 mm. long, entire, pale green, firm; calyx about 6 mm. long; petals 15–20 mm. long, reddish purple.

Dry chaparral ridges, Transition and Upper Sonoran Zones; central California from Sonoma and Mariposa Counties south to southern California. Type locality: summits of the mountains in the vicinity of Santa Barbara. May–July.

Pickeringia montana subsp. *tomentosa* Abrams (*Xylothermia montana* subsp. *tomentosa* Abrams, Bull. Torrey Club 34: 263. 1907). Young twigs and leaves canescent. The common form from the San Bernardino Mountains, California, to northern Lower California. Type locality: El Nido, San Diego County, California.

3. LUPINUS* L. Sp. Pl. 721. 1753.

Annual, biennial, or perennial herbs or shrubs, 5–240 cm. tall. Leaves alternate, palmately compound or rarely unifoliolate; petioles short or much elongated, dilated at base, stipulate; leaflets usually 5–17, rarely 3 or 4. Flowers 5–20 mm. long, racemose, the pedicels 1–12 mm. long. Calyx bilabiate, the lips entire, toothed, or the upper bifid, often with interstitial bracteoles. Banner commonly with a ventral median sulcus, a pair of rounded umboes near the center, the sides commonly reflexed, the back glabrous or more or less pubescent; wings usually glabrous; keel arcuate or nearly straight along the upper edges, often ciliate along the upper margins, sometimes also on the lower edges near claws. Stamens 10, monadelphous, the anthers alternately of two forms, elongated and short. Pistil of one carpel, becoming a flattened legume; ovules 2–12. Seeds with a sunken hilum, which is often thus surrounded by a thickened ring. [Latin, from *Lupus*, a wolf, because of an erroneous impression that these plants rob the soil.]

A genus of perhaps 200 species, mostly of North and South America, where particularly abundant in the western mountains, but also represented by a few annuals in the Mediterranean region of the Old World. Type species, *Lupinus albus* L.

Cotyledons sessile, perfoliate; ovules usually two only; annuals.

Flowers verticillate; keel ciliate on the upper margins near claws, sometimes also below.

Flowers non-verticillate; keel non-ciliate.

A. MICROCARPI.

B. PUSILLI.

Cotyledons petioled after germination; ovules two to twelve or more.

Plants annual or biennial.

Flowers verticillate.

Keel ciliate on both upper and lower margins, near the claws.

E. SUCCULENTI.

Keel ciliate on the upper margins only and near apex, or non-ciliate.

G. MICRANTHI.

Flowers non-verticillate.

Keel non-ciliate.

C. CONCINNI.

Keel ciliate on lower margins near claws and also often on the upper margins.

Racemes longer than their peduncles.

F. SPARSIFLORI.

Racemes shorter than their peduncles.

D. STIVERSIANI.

Plants perennial.

Keel ciliate between middle and claws, but not between middle and apex.

O. LATIFOLII.

Keel ciliate between middle and apex, or non-ciliate.

Apex of banner normally not much reflexed from upper margin of wings; ventral median sulcus of banner deep, including considerable of the wings.

Pedicels short and stout, usually less than 3 mm. long; banner pubescent on the back.

K. LEUCOPHYLLI.

Pedicels slender, usually 3–12 mm. long.

I. CALCARATI.

Apex of banner normally well reflexed from upper margins of wings; ventral median sulcus of banner usually shallow, including very little of the wings.

Upper calyx-lip entire, emarginate, or bidentate.

Calyx-cup strongly spurred above pedicel.

I. CALCARATI.

Calyx-cup subsymmetrical, sometimes slightly gibbous but not spurred.

Stems without long-petioled lower leaves at flowering time.

Keel non-ciliate.

N. ALBICAULES.

Keel more or less ciliate on upper edges.

M. ARBOREI.

Stems with some long-petioled lower leaves at flowering times.

Leaves largely basal and long-petioled, the stems usually stout and fistulous, few-leaved.

Keel non-ciliate.

P. POLYPHYLLI.

Keel ciliate on upper edges.

Q. SAXOSI.

Leaves many, the upper cauline well developed.

Banner more or less pubescent on the back.

L. SERICEI.

Banner glabrous and leaves usually greenish above.

M. ARBOREI.

* Text of the genus *Lupinus* contributed by Charles Piper Smith.

Upper calyx-lip cleft to middle or bifid.

Without long-petioled leaves at flowering time.

L. SERICEI.

With some long-petioled leaves at flowering time.

Flowers crowded in dense racemes, mostly spicate or capitate.

H. CAESPITOSI.

Flowers scattered or in verticils in rather loose racemes.

R. MAGNIFICI.

Leaves largely basal, stem-leaves few.

Stems well developed and with many leaves.

Dwarf plants less than 2 dm. tall, commonly shrubby and matted.

J. BREWERIANI.

Plants usually over 3 dm. tall, often much-branched shrubs.

L. SERICEI.

A. MICROCARPI.

Flowers ascending to suberect in anthesis.

Banner 7–11 mm. wide, rounded at apex; both wing and keel petals ciliate near claws on both upper and lower edges.

1. *L. horizontalis*.

Banner 4–6 mm. wide, angled at apex; neither wing nor keel petals ciliate on lower edges.

2. *L. microcarpus*.

Flowers spreading in anthesis.

Flowers becoming suberect soon after anthesis, usually not secund.

3. *L. subvexus*.

Flowers spreading or distinctly secund after anthesis.

Stems often fistulous; banner elliptic or oval, rarely ovate; keel sparsely ciliate or non-ciliate below, near claw; seeds smooth or roughened, but not tuberculate.

4. *L. densiflorus*.

Stems never fistulous; banner ovate; keel densely ciliate below as well as above, near claws; seeds uniformly dark brown and tuberculate.

5. *L. luteolus*.

B. PUSILLI.

Pods lance-oblong, hirsute, constricted between the seeds; peduncles very short, the racemes equaled or surpassed by the foliage; seeds lenticular.

10. *L. pusillus*.

Pods oblong or ovate, scarcely constricted between the seeds; peduncles well developed; seeds more or less oblong.

Pods oblong, about 20 mm. long, smooth or scaly on the sides; ovules 2–6.

9. *L. odoratus*.

Pods ovate, or not over 15 mm. long; ovules 2.

Banner suborbicular; racemes elongated; pods loosely villous on the sides.

7. *L. rubens*.

Banner longer than wide.

Stems and petioles loosely villous; racemes usually subcapitate; pods loosely villous on the sides.

6. *L. brevicaulis*.

Stems and petioles short-velvety; racemes elongated and flowers scattered; pods smooth or scaly on the sides.

8. *L. Shockleyi*.

C. CONCINNI.

One species.

11. *L. concinnus*.

D. STIVERSIANI.

One species.

12. *L. Stiversii*.

E. SUCCULENTI.

One species.

13. *L. succulentus*.

F. SPARSIFLORI.

Largest leaflets 15–25 mm. wide; plants with stinging hairs 2–5 mm. long.

14. *L. hirsutissimus*.

Largest leaflets 2–12 mm. wide; longest hairs not over 2 mm. long.

Keel stout, with short, blunt acumen, woolly-ciliate on the upper margins.

15. *L. truncatus*.

Keel with slender, acute acumen.

Matured pods ascending; petals blue, lilac or purple.

Pedicels 5–9 mm. long; floral bracts much exceeding the buds, usually early deciduous.

16. *L. Benthamii*.

Pedicels 2–4 mm. long; bracts not greatly exceeding the buds, often subsistent.

17. *L. sparsiflorus*.

Matured pods deflexed; petals neither blue nor purple.

Plants 2–4 dm. tall; petals white or pinkish; pods five- to eight-seeded.

18. *L. deflexus*.

Plants 1–2 dm. tall; petals orange or golden; pods two- to four-seeded.

19. *L. citrinus*.

G. MICRANTHI.

Pedicels 3–8 mm. long; flowers 8–16 mm. long; banner suborbicular or wider than long; verticils four to several.

20. *L. nanus*.

Pedicels 1–3 mm. long.

Banner cuneate or spatulate; keel short and broad, the blunt acumen scarcely upturned.

23. *L. micranthus*.

Banner neither cuneate nor spatulate; keel slender, with the long, narrow acumen often much upturned.

Pods 6–9 mm. wide; seeds 4–5 mm. long by fully 3 mm. wide.

21. *L. pachylobus*.

Pods 3–5 mm. wide; seeds 2–3 mm. long by about 2 mm. wide.

22. *L. bicolor*.

H. CAESPITOSI.

Racemes capitate or subcapitate, rarely more than twice as long as wide; peduncles often curved or bent, spreading or decumbent; stems often woody near base.

24. *L. Lyallii*.

Racemes cylindrical or conoidal, usually more than twice as long as wide.

Banner suborbicular, about as wide as long; peduncles shorter than the elongated, leafy stems.

29. *L. hypolasius*.

Banner usually longer than wide.

Peduncles very short, the racemes subsessile and surpassed by the foliage.

25. *L. caespitosus*.

Peduncles well developed, the racemes equaling or surpassing the foliage.

Stems poorly developed, few-leaved; flowers 6–9 mm. long, mostly crowded in the raceme.

26. *L. aridus*.

Stems well developed, many-leaved.

Largest leaflets usually under 30 mm. long, silky above.

27. *L. lepidus*.

Largest leaflets usually over 30 mm. long (3–8 cm.), greenish, subsericeous to glabrate above.

28. *L. pratensis*.

I. CALCARATI.

Wing-petals rather densely pubescent on outer surface near upper distal corner, or calyx-cup distinctly spurred, banner long-clawed, and upper calyx-lip much exposed. 30. *L. laxiflorus*.

Wing-petals not pubescent near upper distal corner, though sometimes with a few scattered villi on the outer surface near claws.

Leaflets glabrous or glabrate above.

Stems without long-petioled lower leaves at flowering time.

Stems much branched above.

38. *L. corymbosus*.

Stems simple or nearly so.

39. *L. tenellus*.

Stems with some long-petioled lower leaves at flowering time.

Keel non-ciliate.

Stems not fistulose; flowers scattered or subverticillate.

40. *L. oreganus*.

Stems fistulose; flowers in crowded verticils.

41. *L. Biddlei*.

Keel ciliate.

Keel arcuate.

42. *L. mucronulatus*.

Keel nearly straight.

43. *L. onustus*.

Leaflets permanently pubescent above.

Stems without long-petioled lower leaves at flowering time; pedicels spreading-pubescent; keel ciliate; calyx-cup short-spurred or strongly gibbous. 31. *L. inyoensis*.

Stems with some long-petioled lower leaves at flowering time.

Calyx-cup strongly gibbous or spurred.

32. *L. caudatus*.

Calyx-cup scarcely gibbous.

Flowers 7–10 mm. long.

Lower leaves long-petioled.

33. *L. holosericeus*.

All leaves short-petioled.

34. *L. meionanthus*.

Flowers 10–14 mm. long.

Banner more or less pubescent on the back; petals usually pale yellow, rarely blue.

35. *L. sulphureus*.

Banner glabrous, or with very few scattered hairs; petals blue, purplish, pinkish, or white.

Pubescence, at least below the inflorescence, mostly appressed, if spreading (var. *mollis*) the keel not ciliate. 36. *L. leucopsis*.

Pubescence largely spreading, keel strongly ciliate on the upper edges.

37. *L. nevadensis*.

J. BREWERIANI.

A single polymorphic species.

44. *L. Breweri*.

K. LEUCOPHYLLI.

Floral bracts caducous; pubescence very dense and closely appressed.

45. *L. Peirsonii*.

Floral bracts mostly persistent; pubescence woolly-canescens or short-villous.

46. *L. leucophyllus*.

L. SERICEI.

Low alpine dwarfs, scarcely 1 dm. tall; leaves crowded basally; peduncles scapose; flowers 11–12 mm. long; racemes subcapitate.

Pubescence loosely ascending.

44. *L. Breweri* var.

Pubescence closely appressed.

49. *L. lapidicola*.

Plants 2–15 dm. tall.

Keel narrow, with long slender acumen and narrowed toward the claws.

Keel non-ciliate or with 1–5 scattered cilia; longest petioles about 2 cm. long, about equaling the leaflets.

47. *L. Chamissonis*.

Keel ciliate along upper edges of acumen, or lower petioles much longer than their leaflets.

48. *L. albifrons*.

Keel broader, not narrowed toward the base, usually ciliate along more or less of the upper edges.

Upper leaves short-petioled.

Pedicels appressed-pubescent.

Pubescence dense, usually silvery or satiny; banner glabrous or more or less silky on the back.

50. *L. ornatus*.

Pubescence thin, leaves distinctly green; banner usually sparsely silky on the back.

51. *L. alpicola*.

Pedicels spreading-pubescent.

Banner pubescent on the back.

With a few long-petioled lower leaves at flowering time; upper calyx-lip bidentate.

52. *L. sericeus*.

With no long-petioled leaves at flowering time; upper calyx-lip bifid.

53. *L. Abramii*.

Banner normally glabrous.

Flowers 11–14 mm. long; keel sparsely ciliate on the upper edges; petals largely blue.

54. *L. Suksdorfii*.

Flowers 15–18 mm. long; keel densely ciliate on the upper edges; petals bright yellow, or rarely bluish.

55. *L. Sabini*.

Most or all of the leaves long-petioled.

Stems and petioles appressed-silky.

Largest leaflets not over 12 mm. wide.

56. *L. excubitus*.

Largest leaflets 15–30 mm. wide.

57. *L. sericatus*.

Stems and petioles with widely spreading hairs.

Largest leaflets 15–30 mm. wide.

58. *L. cervinus*.

Largest leaflets not over 12 mm. wide.

Leaflets oblanceolate; pubescence more downy than woolly; racemes 10–15 cm. long.

59. *L. Grayi*.

Leaflets cuncate or spatulate; pubescence distinctly woolly; racemes 15–20 cm. long.

60. *L. ludovicianus*.

M. ARBOREI.

Stems erect or ascending.

Leaflets commonly 5 cm. long, permanently subsilky above; seeds without pale spots at the micropyle. 61. *L. longifolius*.

Leaflets usually less than 4 cm. long, or plant not a shrub.

Plants usually true shrubs; seeds 4-6 mm. long, with a pair of contiguous pale spots embracing the micropyle. 62. *L. arboreus*.

Plants strictly herbaceous, or suffrutescent only at base; seeds about 3 mm. long, without pale spots at the micropyle.

Floral bracts mostly persistent and villous; leaves more or less villous on both sides. 67. *L. Covillei*.

Floral bracts deciduous; leaves glabrous or glabrate above.

Leaflets linear, with long-petioled lower leaves at flowering time. 68. *L. gracilentus*.

Leaflets oblanceolate, without long-petioled leaves at flowering time. 63. *L. rivularis*.

Stems usually decumbent at base, where more or less woody.

Roots not bright yellow.

Stems 4-6 mm. thick; most of the petioles about equaling their leaflets. 63. *L. rivularis*.

Stems 2-3 mm. thick; most or all of the petioles 2-3 times as long as their leaflets. 64. *L. varicolor*.

Roots bright yellow.

Leaflets 5-9, greenish; stems usually with some spreading hairs; ovules 9-14. 65. *L. littoralis*.

Leaflets 3-5, silvery-silky; stems appressed-pubescent; ovules 5-8. 66. *L. Tidestromii*.

N. ALBICAULES.

Banner narrow, acute at apex, median line much curved in bud; wings narrow and keel much exposed.

69. *L. albicaulis*.

Banner ovate to suborbicular, usually obtuse or rounded at apex; wings wider and keel largely or entirely covered.

Stipules foliaceous, green, lanceolate, oblanceolate, elliptic, or oval.

72. *L. fulcratus*.

Stipules subulate or linear, not leaf-like.

Leaflets greenish, not silky, sometimes glabrate above.

Flowers 8-14 mm. long.

Stems sparsely appressed-pubescent.

71. *L. Andersonii*.

Stems shortly spreading-pubescent.

74. *L. adsurgens* var.

Flowers 14-18 mm. long.

Petals consistently all cream-colored or yellow.

70. *L. croceus*.

Petals blue or purple, only the center of banner yellow.

75. *L. formosus* var.

Leaflets densely pubescent, grayish, whitish, or silvery, more or less silky.

Flowers 14-18 mm. long.

75. *L. formosus*.

Flowers 8-14 mm. long.

Plants 5-9 dm. tall; leaflets silvery-silky above, often duller below.

73. *L. clatus*.

Plants 2-5 dm. tall; leaflets not silvery-silky above.

Stems and petioles mostly appressed-pubescent.

74. *L. adsurgens* var.

Stems and petioles largely spreading-pubescent.

75. *L. formosus* var.

O. LATIFOLII.

One species.

76. *L. latifolius*.

P. POLYPHYLLI.

Floral bracts persistent or tardily deciduous; pedicels spreading-pubescent; leaflets 5-9. 77. *L. Burkei*.

Floral bracts early deciduous; pedicels commonly appressed-pubescent.

Leaflets 5-9, rarely 10, usually not over 8 cm. long.

78. *L. superbus*.

Leaflets 10-17, 6-15 cm. long.

79. *L. polyphyllus*.

Q. SAXOSI.

Leaves silvery-silky above.

80. *L. minimus*.

Leaves green, glabrous to loosely villous or sparsely appressed-pubescent above.

Petioles 2-4 cm. long; flowers 10-12 mm. long; stems and leaves conspicuously villous.

81. *L. volcanicus*.

Petioles 5-30 cm. long.

Largest leaflets 2-4 cm. long; longest petioles usually less than 10 cm. long.

82. *L. saxosus*.

Largest leaflets 5-8 cm. long; longest petioles usually 10-30 cm. long.

83. *L. arcticus*.

R. MAGNIFICI.

One species.

84. *L. magnificus*.

1. *Lupinus horizontalis* Heller. Sunset Platycarpus. Fig. 2560.

Lupinus horizontalis Heller, *Muhlenbergia* 2: 74. 1905.

Pubescent with short spreading hairs, 10-12 cm. tall, branched, the lower branches prostrate, all floriferous. Leaves long-petioled, glabrous above, petioles 4-6 cm. long, leaflets 7-9, oblanceolate, 1-2 cm. long; peduncles 3-4 cm. long, racemes 5-8 cm. long, equaling or surpassing the foliage; flowers about 10 mm. long, ascending to suberect, whorled, bracts persistent, reflexed, pedicels 1-2 mm. long; calyx pubescent, upper lip cleft, lower bidentate; petals pale violet-blue, banner almost plane, about 7 mm. wide, wings 4-5 mm. wide, keel straight, both wings and keel ciliate on both upper and lower edges near claws; pods ovate, villous, 12 mm. long, ovules 2, seeds 3 mm. long, marked with small dark spots.

Dry gravelly hillsides, Lower Sonoran Zone; known only from the original collection. Type locality: Sunset, Kern County, California. April.

Lupinus horizontalis var. *platypetalus* C. P. Smith, *Bull. Torrey Club* 45: 12. 1918. Branches all ascending; flowers 13-15 mm. long, banner 11-12 mm. wide, its sides reflexed, wings 6-7 mm. wide. Desert sands, at the base of the mountains, northern San Bernardino and northeastern Kern Counties, California; Lower Sonoran Zone. Type locality: eastern base of Fremont's Peak, San Bernardino County, California.

2. *Lupinus microcarpus* var. *ruber* (Heller) C. P. Smith. Red-flowered Platycarpus. Fig. 2561.

Lupinus ruber Heller, *Muhlenbergia* 2: 73. 1905.

Villous, 1–5 dm. tall, often much branched, the branches ascending to erect, floriferous. Leaves long-petioled, glabrous above, petioles 4–8 cm. long, leaflets 5–8, oblanceolate to spatulate, 1–2 cm. long; peduncles 2–7 cm. long, racemes 3–6 cm., of 2–5 verticils; flowers 8–10 mm. long, erect or ascending, bracts persistent, pedicels barely 1 mm. long; upper calyx-lip hardly 2 mm. long, cleft with rounded lobes or slender teeth, lower lip 8 mm. long, bidentate, the slender teeth often divergent; petals dull red to pink, banner almost plane, lance-ovate, angled at apex, 2–4 mm. wide, wings narrow, scarcely ciliate, keel straight, ciliate above near the claws; pods ovate, 12–17 mm. long, more or less villous, ovules 2, seeds pale, about 3 mm. long, rugose.

Dry soils, Lower Sonoran Zone; San Benito and Kern Counties, California, to Lower California. Type locality: Tehachapi, Kern County, California. May–July.

Lupinus microcarpus var. *scopolòrum* C. P. Smith, *Bull. Torrey Club* 51: 100. 1924. (*Lupinus densiflorus* var. *scopulorum* C. P. Smith, *Bull. Torrey Club* 45: 201. 1918.) Long-villous; verticils approximate; flowers suberect, about 15 mm. long, all petals light yellow, banner about 7 mm. wide, acute at apex; seeds about 5 mm. long, dull, dark brown. Clay soils, seashore cliffs, Arid Transition Zone; Vancouver Island and islands off Puget Sound. Type locality: Beacon Hill Park, Victoria, British Columbia. Vancouver Platycarpus.

3. *Lupinus subvexus* C. P. Smith. Intermediate Platycarpus. Fig. 2562.

Lupinus subvexus C. P. Smith, *Bull. Torrey Club* 44: 405. 1917.

Loosely villous, the hairs 2–4 mm. long, simple or branched, 2–4 dm. tall. Flowers spreading in anthesis, soon becoming suberect, 14–16 mm. long, in 3–7 distinct verticils, bracts soon reflexing, pedicels 2 mm. long; petals dark violet-purple, lilac, or rose-pink, banner rounded at apex, wings usually non-ciliate, keel nearly straight, ciliate above near claws; pods and ovules as in the last, seeds 4–5 mm. long, rough, dark brown.

Clay soils, Upper Sonoran Zone; Yolo County to Mount Hamilton, California. Type locality: Madison, Yolo County, California. April–June. Intermediate between *L. microcarpus* Sims and *L. densiflorus* Benth., and usually interpreted as the former.

Lupinus subvexus var. *fluviatilis* C. P. Smith, *Bull. Torrey Club* 45: 14. 1918. Lower, 10–25 cm. tall; floral bracts tardily or not at all reflex-withering; seeds flesh-colored, obscurely mottled. Yakima and Kittitas Counties, Washington. Yakima Platycarpus.

Lupinus subvexus var. *transmontanus* C. P. Smith, *Bull. Torrey Club* 45: 15. 1918. Bracts early reflex-withering; banner angled at apex, 5–7 mm. wide. Eastern and southern Oregon to Siskiyou and Lassen Counties, California. Type locality: Antelope, Wasco County, Oregon. Oregon Platycarpus.

Lupinus subvexus var. *phoeniceus* C. P. Smith, *Bull. Torrey Club* 45: 17. 1918. Flowers smaller, about 10 mm. long; banner angled at apex, 9–11 mm. long; foliage greenish. Mount Hamilton Range, California. Mount Hamilton Platycarpus.

Lupinus subvexus var. *albicanatus* C. P. Smith, *Bull. Torrey Club* 45: 19. 1918. Banner 12–14 mm. long, but as narrow; foliage white woolly-villous. Upper Salinas Valley, Monterey and San Luis Obispo Counties, California. Salinas Platycarpus.

Additional varieties may be recognized by referring to the paper indicated by the above citations.

4. *Lupinus densiflorus* Benth. Dense-flowered Platycarpus. Fig. 2563.

Lupinus densiflorus Benth. *Tran. Hort. Soc. Lond.* II. 1: 410. 1835.

Appressed- or subappressed-pubescent, 2–5 dm. tall, simple or branched well above the base, often succulent and fistulose. Leaves long-petioled, glabrous above, leaflets 7–9, oblanceolate, 3–5 cm. long; peduncles 5–20 cm. long, racemes sometimes longer, verticils 5–12, approximate or well-separated; flowers 14–18 mm. long, spreading during and after anthesis, but becoming secund when the rachis deflexes, bracts reflexing, pedicels 1–2 mm. long; upper calyx-lip short, scarious, notched or cleft, lower lip much longer, green, bi- or tridentate, bent and subsaccate near base; petals lilac, rose, or nearly white, banner elliptic, rounded at apex, keel ciliate on upper edges near claws, likewise often the wings; pods ovate-oblong, ovules 2, seeds extremely variable.

Clays or gravels, fields, hillsides, and ravines; Sonoma and Napa Counties to Santa Clara County, California. Type locality: California. April–June.

Lupinus densiflorus var. *Menzièsii* (Agardh) C. P. Smith, *Bull. Torrey Club* 45: 176. 1918. (*Lupinus Menzièsii* Agardh, *Syn. Gen. Lup.* 2. 1835; *Lupinus Menzièsii aurea* Kell. *Proc. Calif. Acad.* 5: 16. 1873.) Stout and fistulose, pubescence sparse and appressed, petals yellow, often edged with reddish purple. Sacramento and Marin Counties to Santa Barbara County. Type locality: California. Menzies' Platycarpus.

Lupinus densiflorus var. *glareosus* (Elmer) C. P. Smith, *Bull. Torrey Club* 45: 180. 1918. (*Lupinus glareosus* Elmer, *Bot. Gaz.* 39: 53. 1905.) Leaflets succulent, blackening in drying; petals light blue, banner with a white center. Stream gravels, Mount Pinos, Ventura County, California. Type locality: Griffen's Post-office, Ventura County, California. Mount Pinos Platycarpus.

Lupinus densiflorus var. *lacteus* (Kell.) C. P. Smith, *Bull. Torrey Club* 45: 181. 1918. (*Lupinus lacteus* Kell. *Proc. Calif. Acad.* 5: 37. 1873; *Lupinus arenicola* Heller, *Muhlenbergia* 2: 75. 1905.) Pubescence spreading or retrorsely spreading; lower calyx-lip nearly straight, scarcely bent or subsaccate near base; petals nearly white; plants usually acaulescent and unbranched. Sandy soil, Kern County to San Diego County, California. Type locality: Oak Creek hillsides, 14 miles from Tejon Pass, Kern County, California. Acaulescent Platycarpus.

Lupinus densiflorus var. *versabilis* C. P. Smith, *Bull. Torrey Club* 45: 187. 1918. Similar to the last, as to pubescence, but lower calyx-lip bent and subsaccate; petals often rose or purple; stems often branched. San Joaquin and Amador Counties to Kern County, California. Type locality: Fresno, California. Fresno Platycarpus.

Lupinus densiflorus var. *palustris* (Kell.) C. P. Smith, *Bull. Torrey Club* 45: 191. 1918. (*Lupinus densiflorus* Agardh, *Syn. Gen. Lup.* 3. 1835; *Lupinus palustris* Kell. *Proc. Calif. Acad.* 5: 16. 1873.) Long-villous, especially the bent and subsaccate lower calyx-lip; plants stout, 20–60 cm. tall. Contra Costa County to Monterey, California. Type locality: San Joaquin River, California. Agardh's Platycarpus.



2555



2556



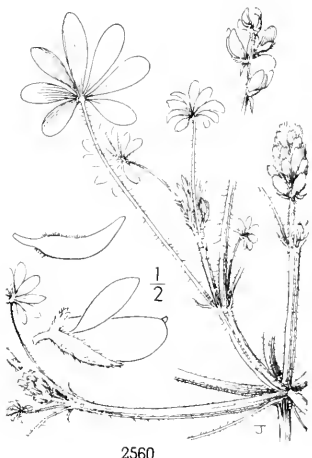
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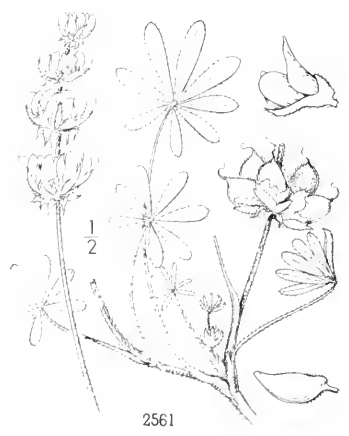
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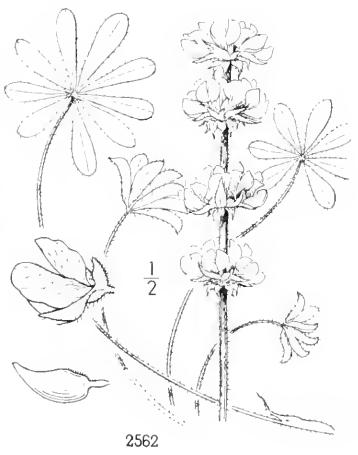
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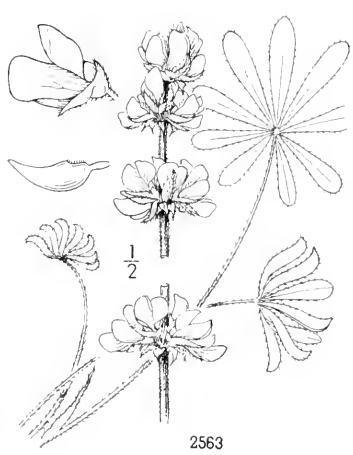
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2563

2555. *Thermopsis montana*
2556. *Thermopsis gracilis*
2557. *Thermopsis macrophylla*

2558. *Thermopsis argentata*
2559. *Pickeringia montana*
2560. *Lupinus horizontalis*

2561. *Lupinus microcarpus*
2562. *Lupinus subvexus*
2563. *Lupinus densiflorus*

Lupinus densiflorus var. *crinitus* Eastw. Bull. Torrey Club 45: 195. 1918. Low, 8–15 cm. tall, very villous with hairs 3–5 mm. long, short stems and peduncles mostly decumbent or deflexed; verticils 2–4. Bodega Point, Sonoma County, California. Eastwood's *Platycarpus*.

For other varieties see Bull. Torrey Club 45: 167–202.

5. *Lupinus luteolus* Kell. Kellogg's *Platycarpus*. Fig. 2564.

Lupinus luteolus Kell. Proc. Calif. Acad. 5: 38. 1873.

Lupinus Bridgesii A. Gray ex S. Wats. Proc. Amer. Acad. 8: 538. 1873.

Appressed-subsilky, much like the last, but strictly fibrous and rigid, 3–9 dm. tall, widely branched above. Leaflets cuneate-oblong; verticils few or many, crowded; petals pale yellow, banner ovate, angled at apex, wings distinctly ciliate above and below near claws; seeds uniformly dark brown, regularly tuberculate.

Alluvial gravels and hillsides, Upper Sonoran and Transition Zones; Jackson County, Oregon, to Contra Costa and San Benito Counties, California. Type locality: near Senal, Mendocino County, California. June–Aug.

6. *Lupinus brevicaulis* S. Wats. Short-stemmed *Platycarpus*. Fig. 2565.

Lupinus brevicaulis S. Wats. Bot. King Expl. 53. 1871.

Lupinus uncialis S. Wats. Bot. King Expl. 54. 1871.

Lupinus scaposus Rydb. Bull. Torrey Club 34: 45. 1907.

Lupinus dispersus Heller, Muhlenbergia 5: 141. 1909.

Densely villous, 3–10 cm. tall, stems scarcely 1 cm. long. Leaves basal, long-petioled, glabrous above, petioles 3–7 cm. long, leaflets 5–8, spatulate, 5–15 mm. long; peduncles 3–6 cm. long, racemes subcapitate, about 2 cm. long in flower, elongating later, barely surpassing the foliage; flowers 6–8 mm. long, crowded, pedicels 1–2 mm. long, villous; calyx villous, upper lip 1–2 mm. long, truncate to bifid with a broad sinus, lower lip 4–6 mm. long, entire to tridentate; petals bright blue or paler, banner narrow, the apex angled or rounded, keel straight, non-ciliate; pods ovate, about 10 mm. long, ovules 2 or 3, seeds 2 mm. long.

Desert sands, Lower Sonoran Zone; eastern Oregon to Colorado, New Mexico, Chihuahua, and southeastern California. Type locality: "in the valleys and lower canyons of Western Nevada to the East Humboldt Mountains, . . . and on the islands of Salt Lake . . ." May–June.

7. *Lupinus rubens* Rydb. Red-stemmed *Platycarpus*. Fig. 2566.

Lupinus rubens Rydb. Bull. Torrey Club 34: 45. 1907.

Villous, branched at or near the base, 6–15 cm. tall; axial peduncle usually erect, commonly flowering before the branches develop, racemes exceeding the foliage. Flowers 6–12 mm. long, approximate or well scattered, pedicels 1–2 mm. long, glabrous or subvillous; calyx-cup usually glabrous, the lips setose, upper entire or notched, lower entire or toothed; petals as in the last, the banner suborbicular and with a yellow center; pods ovate, 8–12 mm. long, more or less villous on the sides, ovules usually 2, seeds not seen.

Dry sandy soil, Lower Sonoran Zone; southern Utah to Nevada, Arizona, and adjacent California. Type locality: southern Utah. May–June.

Lupinus rubens var. *flavoculatus* (Heller) C. P. Smith, Bull. Torrey Club 46: 404. 1919. (*Lupinus flavoculatus* Heller, Muhlenbergia 5: 149. 1909.) Branches early developing, widely spreading floriferous; pedicels often 3–4 mm. long. Lower Sonoran Zone; western Nevada and adjacent California.

8. *Lupinus Shöckleyi* S. Wats. Shockley's *Platycarpus*. Fig. 2567.

Lupinus Shockleyi S. Wats. Proc. Amer. Acad. 22: 470. 1887.

Densely pubescent with short spreading hairs, subcaulescent, 1–2 dm. tall, axial peduncle erect. Leaves long-petioled, subappressed-silky below, glabrous above except near the margins, petioles 4–10 cm. long, leaflets 7–10, spatulate, 10–20 mm. long; peduncles 3–10 cm. long, racemes 3–6 cm. long, equaled by the foliage; flowers 5–6 mm. long, well scattered, bracts persistent, pedicels slender, 2–3 mm. long, often curved, spreading-pubescent; upper calyx-lip cleft, lower tridentate or rarely cleft; petals blue, purple, or pink, banner longer than wide, angled at apex, keel straight on the upper edges, non-ciliate; pods ovate to oblong, smooth or scaly on the sides, ciliate on the edges, ovules 2, seeds about 3 mm. long, pale, wrinkled and rough.

Desert sands, Lower Sonoran Zone; southern California, western Arizona, and Nevada. Type locality: near Soda Springs, Esmeralda County, Nevada. April–June.

9. *Lupinus odoratus* Heller. Mojave *Platycarpus*. Fig. 2568.

Lupinus odoratus Heller, Muhlenbergia 2: 71. 1905.

Glabrous or sparsely villous, subcaulescent, branches spreading, axial peduncle erect, 1–2 dm. tall. Leaves basal, long-petioled, glabrous above, petioles 4–10 cm. long, leaflets 5–7, cuneate to spatulate, 10–20 mm. long; peduncles 8–15 cm. long, racemes 5–10 cm.; flowers about 10 mm. long, scattered, bracts short, persistent, pedicels 4–6 mm. long, glabrous; calyx glabrous, upper lip notched or entire, lower tridentate or entire; petals blue or purple, banner with a yellow center, suborbicular, keel somewhat curved; pods oblong, 17–20 mm. long, smooth or scaly on the sides, villous on the margins, ovules 2–6, seeds about 3 mm. across, rough.

Lower Sonoran Zone; Mojave Desert and adjacent Arizona and Nevada. Type locality: Kramer, San Bernardino County, California. March–June.

Lupinus odoratus var. *pilosellus* C. P. Smith, Bull. Torrey Club 46: 402. 1919. Stems and petioles conspicuously pubescent with short, spreading hairs; ovules 2–4. Nipton and Mojave River, Mojave Desert, California.

10. *Lupinus pusillus* var. *intermontanus* (Heller) C. P. Smith. Intermontane Low Lupine. Fig. 2569.

Lupinus intermontanus Heller, Muhlenbergia 8: 87. 1912.

Lupinus pusillus var. *intermontanus* (Heller) C. P. Smith, Bull. Torrey Club 46: 408. 1919.

Loosely villous, about 1 dm. tall, branches ascending to widely spreading. Foliage rather congested, petioles two to three times the leaflets, which are usually 5, oblong-oblancoate, rounded at apex, largest about 20 by 7 mm., glabrous above, appressed-long-hairy below; peduncles 1–2 cm. long, racemes 3–5 cm. long, equaled or surpassed by the foliage; flowers 7–9 mm. long, bracts persistent, pedicels and calyx-cup glabrous or subvillous, about 2 mm. long; calyx-lips villous, the upper bifid, the lower tridentate or entire; petals bluish to whitish, banner 7–8 mm. long, obovate or spatulate, keel nearly straight, non-ciliate; pods constricted near the middle, villous; seeds flat, rugose, pale yellow, almost concave-lenticular.

Dry sandy plains, Upper Sonoran Zone; eastern Washington and eastern California to northern Arizona, Colorado, and Wyoming. Type locality: Wadsworth, Washoe County, Nevada. May–July.

11. *Lupinus concinnus* Agardh. Concinnous Annual Lupine. Fig. 2570.

Lupinus concinnus Agardh, Syn. Gen. Lup. 6. 1835.

Densely villous, 6–20 cm. tall, simple or much-branched from the base. Leaves long-petioled, hairy above; petioles 4–8 cm. long, leaflets 5–8, oblanceolate, 10–20 mm. long; racemes nearly sessile, 3–6 cm. long, surpassed by the leaves, a short raceme or one or two flowers 7–9 mm. long, usually well scattered, pedicels 1 mm. long, stout, long-villous; upper calyx-lip cleft, lower tridentate; petals lilac, edged with rich reddish purple, banner obovate, rounded or emarginate at apex, keel nearly straight; pods 10–15 mm. long, ovules 2–4, seeds 2–3 mm. long, angled, nearly square, pale, obscurely spotted.

Dry soils, Lower and Upper Sonoran Zones, Monterey County, California, to New Mexico and Lower California. Type locality: California, probably near Monterey. April–June.

Lupinus concinnus var. *Orcuttii* (S. Wats.) C. P. Smith, Bull. Torrey Club 48: 225. 1921. (*Lupinus Orcuttii* S. Wats, Proc. Amer. Acad. 20: 359. 1885; *Lupinus micensis* M. E. Jones, Proc. Calif. Acad. II. 5: 630. 1895.) Flowers 6–7 mm. long, banner narrower, about 3 mm. wide. Monterey County, California, to southern Utah and New Mexico, Sonora, and Lower California.

Lupinus concinnus var. *optatus* C. P. Smith, Bull. Torrey Club 48: 227. 1921. Larger throughout, 20–30 cm. tall; flowers 10–12 mm. long, banner 7–9 mm. wide. Monterey County to San Diego, California, apparently inhabiting more moist situations. Type locality: Grass Valley, San Bernardino County, California.

Lupinus concinnus var. *Agardhianus* (Heller) C. P. Smith, Bull. Torrey Club 48: 228. 1921. (*Lupinus gracilis* Agardh, Syn. Gen. Lup. 15. 1835, not *Lupinus gracilis* Nutt., Journ. Acad. Phila. 7: 115. 1834. *Lupinus Agardhianus* Heller, Muhlenbergia 7: 13. 1911.) Pubescence spreading, but short and less dense; petals bright blue or edged with rose-purple, banner angled at apex. Monterey County to San Diego, California, probably not east of Fort Tejon and Cajon Pass. Type locality: California, probably near Monterey.

Lupinus concinnus var. *pallidus* (Brandg.) C. P. Smith, Bull. Torrey Club 48: 229. 1921. (*Lupinus pallidus* Brandg. Zoe 4: 203. 1893.) Pubescence mainly appressed; leaflets 5–6, spatulate; petals white or pale bluish. Alluvial sands, Lower Sonoran Zone; southern San Diego County, California, and adjacent Lower California. Type locality: Mission San Vincente, northern Lower California.

Lupinus concinnus var. *desertorum* (Heller) C. P. Smith, Bull. Torrey Club 48: 230. 1921. (*Lupinus desertorum* Heller, Muhlenbergia 2: 72. 1905.) Pubescence mainly appressed; leaflets 6–9, oblanceolate; petals white or yellowish. Gravelly hillsides, Lower Sonoran Zone; Kern and San Bernardino Counties, California. Type locality: Randsburg, Kern County, California.

12. *Lupinus Stiversii* Kell. Stivers' Annual Lupine. Fig. 2571.

Lupinus Stiversii Kell. Proc. Calif. Acad. 2: 192. 1862.

Minutely pubescent, 15–45 cm. tall, branches ascending. Leaves long-petioled, appressed-pubescent on both sides; petioles 3–8 cm. long, leaflets 6 or 7, cuneate to spatulate or obovate, 12–40 mm. long; peduncles 3–8 cm. long, racemes 1–3 cm. long, few-flowered; flowers about 15 mm. long, pedicels about 2 mm. long, appressed-pubescent; upper calyx-lip cleft, lower entire; banner bright yellow, wings rose-pink or purple, keel nearly straight above, the acumen blunt, ciliate both above and below near claws; pods about 20 mm. long, ovules 5–7, seeds flat, angled, scarcely 3 mm. long, dark-spotted.

Sands or gravels, Upper Sonoran and Lower Transition Zones; Sierra foothills, Butte County to the San Bernardino Mountains, and in the Santa Lucia Mountains, Monterey County, California. Type locality: Summit Meadows, Mariposa-Yosemite Trail, Mariposa County, California. April–July.

13. *Lupinus succulentus* Dougl. Succulent Annual Lupine. Fig. 2572.

Lupinus succulentus Dougl. ex K. Koch, Wochenschr. Gärt. & Pfl. 4: 277. 1861.

Lupinus affinis of American authors, not Agardh.

Glabrate or sparsely appressed-pubescent, 2–9 dm. tall, stout, usually succulent or fistulous, branched. Leaves long-petioled, glabrous above, petioles 6–12 cm. long, leaflets 7–9, cuneate to cuneate-obovate, 2–7 cm. long, 6–16 mm. wide; peduncles 2–8 cm. long, racemes 6–30 cm.; flowers 12–17 mm. long, subverticillate in 4–8 whorls or groups, spreading in anthesis, ascending later, bracts early deciduous, pedicels 4–6 mm. long, spreading-pubescent; upper calyx-lip toothed or cleft, lower entire or tridentate; petals deep blue to almost white, banner with yellow center turning violet, wings slightly ciliate at the base above, keel somewhat curved, ciliate near claws both above and below; pods about 5 cm. long, loosely pubescent or villous, ovules 8–10, seeds oblong, 4–5 mm. long, marbled with dark brown, a pair of whitish spots about the micropyle.

Ravines, moist hillsides, and fields, Upper Sonoran and Transition Zones; Butte County, California, to Lower California. Adventive in Arizona, presumably at Roosevelt Dam. Type locality: California. Feb.–May.

14. *Lupinus hirsutissimus* Benth. Nettle Annual Lupine. Fig. 2573.

Lupinus hirsutissimus Benth. Trans. Hort. Soc. Lond. II. 1: 141. 1833.

Hirsute with nettle-like stiff hairs 3–5 mm. long, stout, fistulose, 2–6 dm. tall. Leaves long-petioled, leaflets 5–8, broadly cuneate-obovate, 2–5 cm. long, 15–20 mm. wide; peduncles 5–8 cm. long, racemes 10–25 cm. long; flowers 13–15 mm. long, scattered, spreading, pedicels 3–4 mm. long; upper calyx-lip cleft, lower entire or tridentate; petals violet or lilac, banner suborbicular, keel stout, straight on the upper edges, ciliate on the lower edges near claws; pods 25–35 mm. long, very hirsute, ovules about 7, seeds 3–4 mm. long, pale and obscurely marked or densely marbled with dark brown.

Foothills and interior valleys, Upper Sonoran Zone; San Mateo County, California, to Lower California. Type locality: California (Douglas). March–May.

15. *Lupinus truncatus* Nutt. Nuttall's Annual Lupine. Fig. 2574.

Lupinus truncatus Nutt. ex Hook. & Arn. Bot. Beechey 336. 1840.

Glabrate or sparsely appressed-hairy, 3–6 dm. tall, branched. Leaves glabrate, petioles 2–8 cm. long, usually flattened, leaflets 5–7, linear, truncate, emarginate, or dentate at the apex, 2–4 cm. long; peduncles 3–10 cm. long, racemes 6–15 cm. long, lax and few-flowered; flowers 10–12 mm. long, spreading or drooping after anthesis, pedicels 2–3 mm. long, bracts usually persistent; upper calyx-lip cleft, lower entire or tridentate; petals violet or pale purple, keel densely ciliate on the upper edges and near the claws below, its acumen stout and blunt; pods spreading, villous, about 3 dm. long, ovules 6 or 7, seeds about 3 mm. long, rhomboidal, plump, obscurely or conspicuously marked.

Open woods and foothills, mostly Upper Sonoran Zone; Monterey County, California, to Lower California. Type locality: San Diego, California. March–May.

16. *Lupinus Benthämii* Heller. Benthām's Annual Lupine. Fig. 2575.

Lupinus Benthämii Heller, Muhlenbergia 2: 61. 1905.

Lupinus leptophyllus Benth. Trans. Hort. Soc. Lond. II. 1: 141. 1835. Not *Lupinus leptophyllus* Cham. & Sch. Linnaea 5: 589. 1830.

Villous, slender, erect, 3–6 dm. tall, simple or branched at the base. Leaves long-petioled, glabrate above, petioles slender, 5–12 cm. long, leaflets 7–10, linear, 2–5 cm. long; peduncles 5–10 cm. long, racemes 10–20 cm. long; flowers 10–12 mm. long, spreading, bracts linear, exceeding the buds, long-villous, deciduous, pedicels 3–6 mm. long; upper calyx-lip cleft, lower tridentate; petals blue, banner suborbicular, the yellow center becoming violet or reddish, keel slender, curved, ciliate on the lower edges near claws; pods 2–3 cm. long, ovules 3 or 4, seeds 2 mm. long, marked with brown.

Moist slopes, mostly near streams, Upper Sonoran Zone; Sierra foothills, Sacramento County to Kern, Santa Barbara, and Monterey Counties, California. Type locality: California (Douglas). March–June.

Lupinus Benthämii var. *opimus* C. P. Smith, Bull. Torrey Club 47: 506. 1920. Larger in all parts except the calyx; stems fistulose; leaflets longer, 2–3 mm. wide; racemes 20–30 cm. long; flowers 14–16 mm. long, pedicels 7–9 mm. long; banner as wide or wider than long, keel more curved. Upper Sonoran Zone; Eldorado County to Los Angeles and San Luis Obispo Counties, California. Type locality: Pollasky, Madera County, California.

17. *Lupinus sparsiflorus* Benth. Loosely-flowered Annual Lupine. Fig. 2576.

Lupinus sparsiflorus Benth. Pl. Hartw. 303. 1848.

Lupinus subhirsutus Davidson, Proc. S. Calif. Acad. 18: 80. 1919.

Appressed-pubescent and more or less villous or subhirsute, 2–4 dm. tall, slender, branched. Leaves long-petioled, hairy or glabrate above, petioles 3–8 cm. long, leaflets 5–9, linear to oblanceolate, angled at apex; peduncles 2–8 cm. long, racemes 8–20 cm. long; flowers 8–13 mm. long, spreading in anthesis, soon becoming suberect, bracts villous, exceeding the buds, early deciduous, pedicels 2–3 mm. long; petals bright blue or purplish, banner with a yellow spot, suborbicular, keel curved, usually ciliate on the lower edges near claws and often also on the upper margins; pods ascending, 12–18 mm. long, ovules 5–6, seeds 2–3 mm. long, angled, dotted or marbled on a pale ground.

Grassy hillsides, clays or sands, Lower and Upper Sonoran Zones; Ventura County, California, to southern Nevada, Arizona, and Lower California. Type locality: collected by Coulter but locality not stated. Feb.–May.

Lupinus sparsiflorus var. *arizonicus* (S. Wats.) C. P. Smith, Bull. Torrey Club 47: 495. 1920. (*Lupinus concinnus* var. *arizonicus* S. Wats. Proc. Amer. Acad. 8: 537. 1873; *Lupinus arizonicus* S. Wats. Proc. Amer. Acad. 12: 250. 1876.) Plants mostly 1–2 dm. tall; flowers 8–10 mm. long. Desert sands, Lower Sonoran Zone; southeastern California to Sonora, Arizona, and southern Nevada. Type locality: in Arizona and southeastern California.

Lupinus sparsiflorus var. *barbatulus* Thorner, Bull. Torrey Club 47: 497. 1920. Stems stout and fistulose; petals pale lilac or purplish. Lower Sonoran Zone; southeastern California and adjacent Arizona to Lower California. Type locality: valley of the Colorado River, Arizona.

Lupinus sparsiflorus var. *inopinatus* C. P. Smith, Bull. Torrey Club 47: 499. 1920. Branched above the middle; leaflets broadest at the apex, where truncate, rounded, or emarginate; racemes lax, 6–15 cm. long. Upper and Lower Sonoran Zones; Cajon Pass, California, to Lower California. Type locality: San Diego, California.

Lupinus sparsiflorus var. *Pondii* (Greene) C. P. Smith, Bull. Torrey Club 47: 501. 1920. (*Lupinus Pondii* Greene, Pittonia 1: 288. 1899.) Much like the last, but lower, branched at the base; racemes compact, 2–8 cm. long. Upper Sonoran Zone; San Diego County, California, to Lower California. Type locality: low plains around the southern shore of San Bartolomé Bay, Lower California.

18. *Lupinus deflexus* Congdon. Congdon's Annual Lupine. Fig. 2577.

Lupinus deflexus Congdon, Muhlenbergia 1: 38. 1904.

Short-hairy, becoming glabrate, simple or branched from the base, 2–4 dm. tall. Leaflets



2564



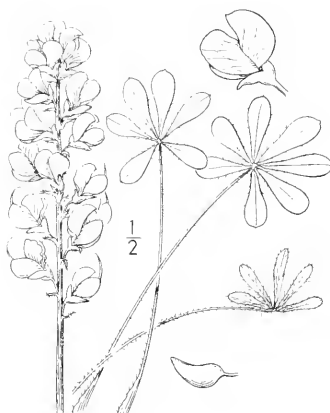
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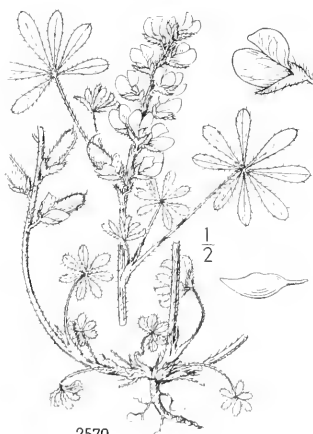
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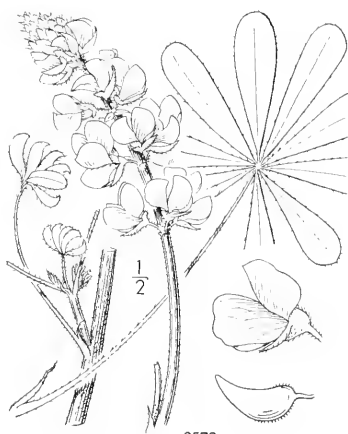
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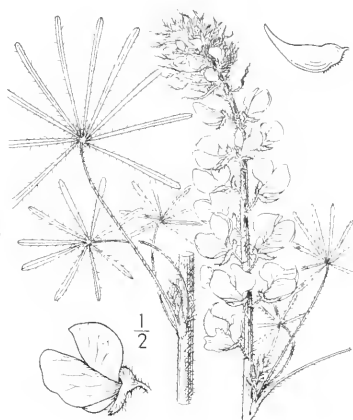
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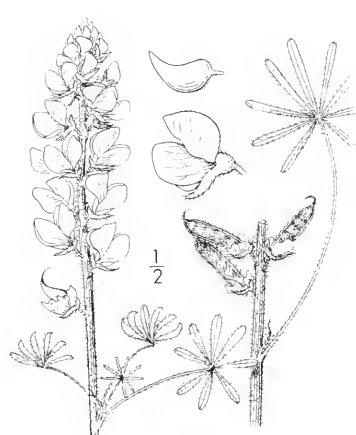
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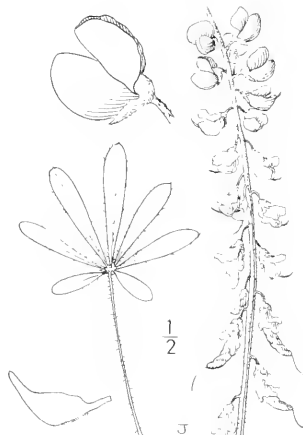
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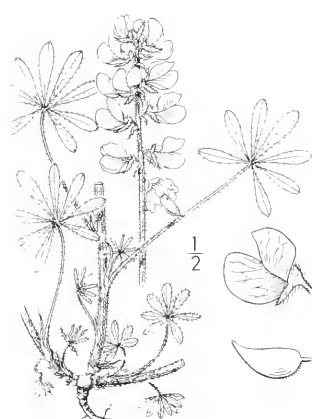
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2573. *Lupinus hirsutissimus*
2574. *Lupinus truncatus*
2575. *Lupinus Bentharii*

2576. *Lupinus sparsiflorus*
2577. *Lupinus deflexus*
2578. *Lupinus citrinus*

2579. *Lupinus nanus*
2580. *Lupinus pachylobus*
2581. *Lupinus bicolor*

about 7, oblanceolate, 15–25 mm. long; flowers spreading in anthesis, soon deflecting, pedicels 3–4 mm. long; upper calyx-lip bilobed, lower bi- or tridentate; petals dull white or pinkish, banner suborbicular, emarginate, keel nearly straight on upper edges, ciliate on the lower edges near the claws; pods deflexed, glabrous, about 20 mm. long, ovules 5–8; seeds about 2 mm. long, dull, unspotted.

Sandy soil, Lower Transition Zone; Mariposa Creek, below Mariposa, Mariposa County, California, the type locality. April–May.

19. *Lupinus citrinus* Kell. Orange-flowered Annual Lupine. Fig. 2578.

Lupinus citrinus Kell. Proc. Calif. Acad. 7: 93. 1877.

Short-hairy, 10–20 cm. tall, branched at the base. Leaflets 6–8, oblanceolate, 15–20 mm. long; flowers spreading in anthesis but soon deflexing, pedicels 3 mm. long, spreading-pubescent; upper calyx-lip cleft, lower minutely tridentate; petals bright orange or golden, banner orbicular, emarginate, keel nearly straight on the upper edges, ciliate on the lower edges near claws; pods deflexed, glabrate, 12–15 mm. long, ovules 2–4, seeds rhomboidal, about 2 mm. long, black-spotted on a pale ground.

Foothills, Transition Zone; Fresno County, California. Type locality: near Fresno, California. June.

20. *Lupinus nanus* Dougl. Douglas' Annual Lupine. Fig. 2579.

Lupinus nanus Dougl. ex Benth. Trans. Hort. Soc. Lond. II. 1: 409. 1835.

Lupinus affinis Agardh, Syn. Gen. Lup. 20. 1835.

Minutely spreading-pubescent, or appressed-pubescent and more or less villous, erect, simple or branched at the base, 2–6 dm. tall. Leaves long-petioled, usually appressed-hairy above, petioles 4–8 cm. long, leaflets 5–7, linear to spatulate, 15–30 mm. long; peduncles 4–8 cm. long, racemes 6–20 cm. long, verticils well separated; flowers 10–16 mm. long, bracts deciduous, pedicels 5–8 mm. long; upper calyx-lip cleft, lower bi- or tridentate; petals rich blue, rarely pink or white, all broad, banner with white or yellow center changing to violet, suborbicular, keel ciliate on upper edges of acumen; pods appressed-pubescent, 20–35 mm. long, ovules usually 4–8, rarely 8–12, seeds 2–3 mm. long, variously colored and marked.

Grassy hills and fields, common, Upper Sonoran and Lower Transition Zones; Mendocino County to Santa Barbara, in the Coast Ranges, and in the Sierra Nevada foothills, Calaveras County to Tulare County, California. Type locality: California. March–June.

Lupinus nanus var. *perlasius* C. P. Smith, Bull. Torrey Club 50: 164. 1923. (*Lupinus spectabilis* Hoover, Leaflets West. Bot. 2: 131. 1938.) Densely long-villous with hairs 2–3 mm. long; flowers about 14 mm. long; ovules 6–7, seeds 4 mm. long. Foothills of the Sierra Nevada, Tuolumne and Mariposa Counties, California.

Lupinus nanus var. *carnosulus* (Greene) C. P. Smith, Bull. Torrey Club 50: 165. 1923. (*Lupinus carnosulus* Greene, Bull. Calif. Acad. II. 6: 144. 1886; *Lupinus affinis* var. *carnosulus* (Greene) Jepson, Fl. W. Mid. Calif. 371. 1901.) Largest leaflets 25–40 mm. long, pods 30–50 mm. long, 7–9 mm. wide, seeds about 5 mm. long, mottled and with a dark marginal line, but no contiguous pale spots embracing the micropyle. Canyon, Upper Sonoran Zone; Bay Region, California, and grassy slopes, western Oregon. Type locality: Olema, Marin County, California.

Lupinus nanus var. *Ménckerae* C. P. Smith, Bull. Torrey Club 50: 167. 1923. Leaflets 10–15 mm. long, 2–3 mm. wide; flowers 10–12 mm. long; petals pale lilac, drying blue; pods 20–25 mm. long, barely 4 mm. wide, ovules 9–12, seeds pale flesh-colored, obscurely marked. Lower Sonoran Zone; Kern County to Coalinga, Fresno County, California. Type locality: Bakersfield, Kern County, California.

Lupinus nanus var. *vallicola* (Heller) C. P. Smith, Bull. Torrey Club 50: 168. 1923. (*Lupinus persistens* Heller, Muhlenbergia 2: 62. 1905, not *L. persistens* Rose; *Lupinus vallicola* Heller, op. cit. 4: 40. 1908.) Flowers 6–10 mm. long, banner usually wider than long, its apex not much reflexed from upper margins of wings, keel strongly curved; seeds pale, scarcely marked. Sierra Nevada foothills, Upper Sonoran and Transition Zones; Butte County to Kern County, probably casual at Wrights, Santa Clara County, California. Type locality: Redding, Shasta County, California.

Lupinus nanus var. *apricus* (Greene) C. P. Smith, Bull. Torrey Club 50: 170. 1923. (*Lupinus apricus* Greene, Leaflets Bot. Obs. 2: 67. 1910; *Lupinus vallicola* var. *apricus* (Greene) C. P. Smith, Muhlenbergia 6: 136. 1911; *Lupinus hirsutus* Greene, Leaflets Bot. Obs. 2: 152. 1911.) Like the last, but banner not wider than long, its apex well reflexed from upper edges of wings, keel arcuate or scarcely curved; seeds dark, well marked. Upper Sonoran and Transition Zones; Vancouver Island, British Columbia, and southwestern Oregon to Monterey County, California. Type locality: Stanford University, California.

21. *Lupinus pachylobus* Greene. Mount Diablo Annual Lupine. Fig. 2580.

Lupinus pachylobus Greene, Pittonia 1: 65. 1887.

Lupinus micranthus var. *pachylobus* (Greene) Jepson, Fl. W. Mid. Calif. 318. 1901.

Conspicuously villous, stout, 1–3 dm. tall, usually branched at the base. Petioles 6–8 cm. long, leaflets 6–8, oblanceolate, 15–25 mm. long, hairy on both sides; peduncles 6–8 cm. long, racemes shorter, verticils 2–4; flowers few, 6–8 mm. long, sometimes scattered, pedicels 1–2 mm. long; upper calyx-lip cleft, lower broad, tridentate; petals blue, banner suborbicular, 6–8 mm. wide, with a white center, keel non-ciliate or nearly so; pods especially large, 25–30 mm. long, 6–9 mm. wide, thick and succulent when green, ovules 4–6, seeds 4–5 mm. long, brown, marked with darker shades.

Grassy hills, Upper Sonoran Zone; Shasta County to Mariposa and Santa Clara Counties, California, perhaps also in San Diego County. Type locality: Briones Hills, east of San Pablo Creek, Contra Costa County, California. March–April.

22. *Lupinus bicolor* Lindl. Lindley's Annual Lupine. Fig. 2581.

Lupinus bicolor Lindl. Bot. Reg. 13: pl. 1109. 1827.

Lupinus micranthus var. *bicolor* S. Wats. Proc. Amer. Acad. 8: 536. 1873.

Lupinus sabulosus Heller, Muhlenbergia 7: 9. 1911.

Lupinus strigosus Gandoger, Bull. Soc. Bot. Fr. 60: 461. 1913.

Usually villous, 1–4 dm. tall, erect and simple or diffusely branched at the base. Leaves pubescent on both sides, petioles 3–7 cm. long, leaflets 5–7, oblanceolate to cuneate, 10–20 mm.

long; peduncles 3–7 cm. long, racemes 1–7 cm. long, verticils 1–3; flowers 8–12 mm. long, rarely scattered or umbellate by reduction of the raceme, pedicels 1–3 mm. long; upper calyx-lip cleft, lower tridentate or entire; petals blue and white, banner about 8 mm. long by 6–8 mm. wide, elliptic, rhombic, obovate, or orbicular-obovate, angled to emarginate at apex, the purple-streaked white center often changing to violet, the sides much reflexed, keel slender, not much curved, ciliate along upper edges of slender acumen; pods appressed-pubescent, 15–20 mm. long, 3–5 mm. wide, ovules 5–8, seeds 2–3 mm. long, variously colored and marked.

Sandy areas, Upper Sonoran and Transition Zones; Vancouver Island, British Columbia to Santa Barbara County, California. Type locality: "in the interior of the country about the Columbia River, from Fort Vancouver to the branches of Lewis and Clark's River . . ." March–June.

Lupinus bicolor var. *umbellatus* (Greene) C. P. Smith, Bull. Torrey Club 50: 377. 1923. (*Lupinus umbellatus* Greene, Bull. Calif. Acad. 2: 145. 1886.) Racemes reduced to one verticil; flowers 6–8 mm. long. Santa Cruz Island, Santa Barbara County, California.

Lupinus bicolor var. *tridentatus* Eastw. Bull. Torrey Club 50: 377. 1923. Verticils 3–6 or more; flowers 6–8 mm. long; lower calyx-lip tridentate. Clay soils and sandy loams, Upper Sonoran Zone; Vancouver Island to San Diego County, California. Type locality: Santa Rosa, Sonoma County, California.

Lupinus bicolor var. *Pipersmithii* (Heller) C. P. Smith, Bull. Torrey Club 50: 380. 1923. (*Lupinus Pipersmithii* Heller, Muhlenbergia 7: 93. 1911.) Flowers 5–8 mm. long; keel non-ciliate or with 1–4 stray cilia. Lower and Upper Sonoran Zones; San Joaquin Valley to Napa, San Mateo, and Monterey Counties, California. Type locality: San Mateo County, near Stanford University, California.

Lupinus bicolor var. *microphyllus* (S. Wats.) C. P. Smith, Bull. Torrey Club 50: 382. 1923. (*Lupinus micranthus* var. *microphyllus* S. Wats. Proc. Amer. Acad. 8: 535. 1873; *Lupinus rostratus* Eastw. Proc. Calif. Acad. II, 6: 424. 1896.) Flowers 4–6 mm. long; keel ciliate; ovules 5–8. Sandy soils, Upper and Lower Sonoran Zones; abundant in southern California and locally appearing northward to Oregon. Type locality: San Diego, California. Exceedingly variable as to form and size of leaflets.

Lupinus bicolor var. *trifidus* (Torr.) C. P. Smith, Bull. Torrey Club 50: 386. 1923. (*Lupinus micranthus* var. *trifidus* S. Wats. Proc. Amer. Acad. 8: 535. 1873; *Lupinus trifidus* Torr. ex S. Wats. Proc. Amer. Acad. 12: 250. 1877.) Flowers 5–8 mm. long; lower calyx-lip deeply trifid. Coastal sands, Humid Transition Zone; San Francisco and Monterey, California. Type locality: San Francisco, California.

23. *Lupinus micranthus* Dougl. Small-flowered Annual Lupine. Fig. 2582.

Lupinus micranthus Dougl. ex Lindl. Bot. Reg. 15: pl. 1251. 1829.

Lupinus polycarpus Greene, Pittonia 1: 171. 1886.

Appressed- or subappressed-pubescent and more or less villous, 1–4 dm. tall, simple or branched at the base, stout and succulent or slender and fibrous. Leaves glabrous or sparsely hairy above, leaflets 5–7, linear to oblanceolate; peduncles 3–6 cm. long, racemes 1–8 cm. long, verticils 2–7; flowers 5–8 mm. long, pedicels stout, 1–2 mm. long; calyx-lips broad, upper cleft, lower tridentate; petals blue and white, banner cuneate or spatulate, center turning violet, the sides scarcely reflexing, keel short and broad, the blunt acumen scarcely upturned, ciliate above, pods 25–30 mm. long, appressed-hairy, ovules 6–7, seeds oblong, thick, 3 mm. long, gray- or brown-mottled.

Clay soils, Lower Sonoran to Arid Transition Zones; Vancouver Island, British Columbia, to San Diego County, California. Type locality: "Upon the gravelly banks of the southern tributaries of the Columbia and on barren ground in the interior of California." March–June.

24. *Lupinus Lyallii* A. Gray. Lyall's Lupine. Fig. 2583.

Lupinus Lyallii A. Gray, Proc. Amer. Acad. 7: 334. 1868.

Subappressed-silky, low, woody at base, rarely over 1 dm. tall. Leaves many, long-petioled, crowded near the base, petioles slender, 3–5 cm. long, leaflets 5–6, oblanceolate, 4–10 mm. long, appressed-silky on both sides; peduncles 5–10 cm. long, usually curved or bent, spreading or decumbent, racemes capitate or subcapitate, about 25 mm. long, rarely more than twice as long as wide; flowers 10–12 mm. long, bracts short, deciduous, pedicels 2 mm. long, spreading-pubescent; upper calyx-lip cleft or deeply lobed, lower entire or tridentate; petals blue, banner glabrous, 8–12 mm. long, wings narrow, keel straight, usually ciliate on the upper edges, but sometimes non-ciliate; pods silky, 10–15 mm. long, ovules 3 or 4, seeds about 2 mm. long.

Dry mountain tops, Boreal Zone; Cascade Mountains of Washington to the southern Sierra Nevada of California. Type locality: summit of the Cascade Mountains, latitude 49°. July–Sept.

Lupinus Lyallii var. *danaus* (A. Gray) S. Wats. Proc. Amer. Acad. 8: 534. 1873. (*Lupinus danaus* A. Gray, Proc. Amer. Acad. 7: 335. 1867.) Flowers only 6–8 mm. long, the petals usually white or pale lilac; leaflets silky, usually not over 6 mm. long. Arctic-Alpine Zone; High Sierra Nevada of California, Mount Dana to Mount Whitney. Type locality: Mount Dana, California.

Lupinus Lyallii var. *Löbbii* (A. Gray) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 525. 1925. (*Lupinus Löbbii* A. Gray ex S. Wats. Proc. Amer. Acad. 8: 533. 1873; *Lupinus aridus* var. *Löbbii* (A. Gray) S. Wats. loc. cit.; *Lupinus alpinus* Heller, Muhlenbergia 6: 22. 1910; *Lupinus paulinus* Greene, Leaflets Bot. Obs. 2: 234. 1912.) Leaflets greenish, 10–12 mm. long; flowers 8–10 mm. long, blue or purplish. Mountain sides, Transition Zone to Canadian Zone; central Sierra Nevada of California to Harney, Deschutes, and Benton Counties, Oregon. Type locality: "in the high Sierras of California."

Lupinus Lyallii var. *fruticulösus* (Greene) C. P. Smith, Bull. Torrey Club 51: 303. 1924. (*Lupinus fruticulösus* Greene, Muhlenbergia 8: 117. 1912.) The stoutest form with stems usually longer than their peduncles and much branched from axillary buds; leaflets quite greenish, often 15–18 mm. long; flowers 8–12 mm. long; racemes sometimes more than twice as long as wide. Transition Zone; southern Cascade Mountains of Oregon (Lane and Klamath Counties). Type locality: Annie Creek Valley, Klamath County, Oregon.

25. *Lupinus caespitosus* Nutt. Stemless Lupine. Fig. 2584.

Lupinus caespitosus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 379. 1840.

Subappressed-silky, dwarf, nearly stemless, 8–12 cm. tall. Leaves long-petioled, silky on both sides, all basal, petioles 5–8 cm. long, leaflets 5–7, oblanceolate, 12–25 mm. long; peduncles scarcely 1 cm. long, the densely-flowered raceme thus nearly sessile, 4–8 cm. long, easily exceeded

by the leaves; flowers 6–8 mm. long, bracts deciduous or subpersistent, pedicels barely 1 mm. long, subappressed-pubescent; upper calyx-lip cleft, lower tridentate; petals pale blue, lilac, or white, banner longer than wide, wings narrow, keel short-ciliate on the upper, nearly straight edges; ovules 3 or 4, pods and seeds not seen.

Dry soils, Sonoran Zones; eastern Oregon to Montana and Colorado. Type locality: "in the grassy valleys of the Rocky Mountains, on the Sweet Waters of the Platte and the Colorado of the West." June–July.

26. *Lupinus áridus* Dougl. Arid-soil Lupine. Fig. 2585.

Lupinus aridus Dougl. ex Lindl. Bot. Reg. 15: pl. 1242. 1829.

Lupinus brachypodus Piper, Bull. Torrey Club 29: 642. 1902.

Appressed-silky and with few or many longer ascending hairs, simple or branched, not woody at base, 1–2 dm. tall. Leaves long-petioled, crowded near the base, petioles 5–8 cm. long, leaflets 6–8, silky on both sides, 12–25 mm. long, oblanceolate; peduncles ascending or erect, 2–10 cm. long, usually exceeded by the foliage, racemes conoidal or cylindric, densely-flowered, 5–10 cm. long, usually exceeding the foliage; flowers 6–9 mm. long, bracts persistent, pedicels 1–2 mm. long, silky; upper calyx-lip cleft, lower bi- or tridentate; petals violet-blue, banner oval or ovate, glabrous, center changing from yellow to purple, keel nearly straight on the ciliated upper edges; pods silky, 10–12 mm. long, ovules 3 or 4, seeds whitish or pinkish, some 3 mm. long.

Dry, barren soil and alluvial gravels, Sonoran Zones; Washington to northern California. Type locality: "Same range of country as *Lupinus leucophyllus*. . . ." May–Aug.

Lupinus aridus var. *washeensis* (Heller) C. P. Smith, Bull. Torrey Club 57: 303. 1924. (*Lupinus pinnatorum* Heller, Muhlenbergia 6: 25. 1910; not Jones, 1898; *Lupinus washeensis* Heller, Muhlenbergia 6: 72. 1910.) Stems numerous, procumbent, pubescence long and widely spreading. Transition Zone; Washoe County, Nevada, and probably in adjacent California. Type locality: ridge south of Alum Creek, Washoe County, Nevada.

Lupinus aridus var. *Torreyi* (A. Gray) C. P. Smith, Bull. Torrey Club 51: 303. 1924. (*Lupinus Torreyi* Gray ex S. Wats. Bot. King Expl. 58. 1871; *Lupinus sellulus* Kell. Proc. Calif. Acad. 5: 36. 1873.) Peduncles elongated, usually exceeding the foliage. Upper Sonoran and Transition Zones; eastern Washington to Tulare County, California, in the Sierra Nevada. Type locality: Donner Lake, Nevada County, California.

Lupinus aridus var. *abortivus* (Greene) C. P. Smith, Bull. Torrey Club 51: 303. 1924. (*Lupinus abortivus* Greene, Muhlenbergia 8: 117. 1912.) Much branched, pubescence mostly appressed and short; racemes slender and loosely flowered. Lower Sonoran Zone; arid southeastern Oregon. Type locality: Stinking Water, Harney County, Oregon.

Lupinus aridus var. *Cusickii* (S. Wats.) C. P. Smith, Bull. Torrey Club 51: 303. 1924. (*Lupinus Cusickii* S. Wats. Proc. Amer. Acad. 22: 469. 1887.) Much branched, with pubescence short and appressed; peduncles shorter and racemes all equalled or surpassed by the foliage, densely flowered. Lower Sonoran Zone, dry foothills of the Blue Mountains, Oregon. Type locality: Upper Burnt River, Baker County, Oregon, hill-sides above the forks.

27. *Lupinus lépidus* Dougl. Prairie Lupine. Fig. 2586.

Lupinus lepidus Dougl. ex Lindl. Bot. Reg. 14: pl. 1149. 1828.

Subappressed-silky, with stems short and leaves basal or stems elongated and leafy, 15–40 cm. tall. Leaves long-petioled, petioles 10–15 cm. long, leaflets oblanceolate, silky on both sides; peduncles 6–15 cm. long, racemes conoidal-cylindric, 8–16 cm. long; flowers exceeding the foliage; flowers 10–13 mm. long, eventually scattered or subverticillate, at least the lower suberect after anthesis; calyx and petals as in the last; pods and seeds similar, somewhat larger.

Dry prairies and slopes, Upper Sonoran and Transition Zones; Vancouver Island to northern California. Type locality: "Port Vancouver to the Great Falls of the Columbia." May–Aug.

Lupinus lepidus var. *Culbertsonii* (Greene) C. P. Smith, Bull. Torrey Club 51: 304. 1924. (*Lupinus Culbertsonii* Greene, Leaflets Bot. Obs. 1: 73. 1904.) Stems usually short, foliage greenish, not silky; lower flowers suberect after anthesis. High Sierra, Tulare County, California; Canadian Zone. Type locality: "Forks of the Kaweah River, at 8,000 feet." Tulare County, California.

Lupinus lepidus var. *confertus* (Kell.) C. P. Smith, Bull. Torrey Club 51: 304. 1924. (*Lupinus confertus* Kell. Proc. Calif. Acad. 2: 192. 1862.) Stems usually elongated and leafy; foliage usually silky, not greenish; flowers many, crowded. Sierra valleys and meadows, Upper Transition Zone; Washoe County, Nevada, and Plumas County, California, to San Bernardino Mountains and Mount Pinos, southern California.

28. *Lupinus pratensis* Heller. Inyo Meadow Lupine. Fig. 2587.

Lupinus pratensis Heller, Muhlenbergia 2: 210. 1906.

Lupinus pratensis var. *eristachyus* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 525. 1925.

Appressed-pubescent below the inflorescence, stems erect, fistulous, light green, 6–9 dm. tall. Leaves mostly short-petioled, finely appressed-hairy on both sides, petioles 3–10 cm. long, leaflets 5–9, linear to linear-oblong, 3–8 cm. long; peduncles 5–13 cm. long, racemes densely-flowered, 8–13 cm. long; flowers 10–12 mm. long, bracts persistent, lanceolate, pedicels 2–3 mm. long, densely spreading-pubescent; upper calyx-lip bidentate, lower entire; petals blue, violet, lilac, or tawny, banner ovate or oval, glabrous, keel straight on the ciliated upper edges; pods 18–20 mm. long, about 5 mm. wide, loosely pubescent, ovules 5, seeds not seen.

Moist sandy soil, Upper Sonoran Zone; Sierra Nevada foothills of Inyo and Mono Counties, California. Type locality: McGee Meadows, west of Bishop, Inyo County, California. May–Sept.

29. *Lupinus hypolásius* Greene. Farewell Gap Dwarf Lupine. Fig. 2588.

Lupinus hypolasius Greene, Leaflets Bot. Obs. 1: 74. 1904.

Subappressed-pubescent and more or less villous, stems longer than the peduncles, stoutish, leafy, suberect, 5–15 cm. tall. Lower leaves long-petioled, petioles slender, 2–8 cm. long, leaflets 5–7, cuneate to oblanceolate, 6–12 mm. long, appressed-hairy above, villous below; peduncles 12–25 mm. long, racemes 5–10 cm. long; flowers in 3–4 verticils, spreading, 7–8 mm. long, bracts

early deciduous or subpersistent, pedicels 1–2 mm. long, spreading-pubescent; upper calyx-lip notched, lower bluntly tridentate; petals purple or blue, banner suborbicular, keel nearly straight on the ciliated upper edges; pods 15 mm. long, villous, ovules 3 or 4, seeds 3 mm. long, obscurely mottled.

High mountain sides, Hudsonian Zone; Tulare and Fresno Counties, California. Type locality: Farewell Gap, Tulare County, California. July–August.

30. *Lupinus laxiflorus* Dougl. Douglas' Spurred Lupine. Fig. 2589.

Lupinus laxiflorus Dougl. ex Lindl. Bot. Reg. 14: pl. 1140. 1826.

Lupinus arbustus Dougl. ex Lindl. Bot. Reg. 15: pl. 1230. 1829.

Lupinus laxiflorus var. *montanus* Howell, Erythraea 3: 33. 1895.

Appressed-subsilky, erect or ascending, 3–8 dm. tall. Leaves cauline, lower long-petioled, subsilky or glabrate above, petioles 3–15 cm. long, leaflets 7–9, oblanceolate, 3–4 cm. long; peduncles 3–8 cm. long, racemes 8–18 cm. long, racemes 8–18 cm. long, compactly or loosely flowered; flowers 11–14 mm. long, bracts early deciduous, pedicels 4–8 mm. long; calyx-cup distinctly spurred above, the spur about 1 mm. long, upper lip green, notched, broad and short, largely or entirely exposed, lower lip narrow, entire or tridentate; petals blue, rose, or pale yellow, banner long-clawed, more or less hairy near middle of dorsal surface, wings pubescent on sides near upper distal angle (rarely glabrous), keel ciliate on upper edges of acumen or rarely non-ciliate; pods 20–25 mm. long, pubescent, ovules 4–6, seeds about 5 mm. long, reddish brown or pinkish, obscurely marked.

Hillsides, Arid Transition Zone; Washington, Oregon, and Idaho. Type locality: "in dry, open, gravelly plains about the great rapids of the River Columbia." April–July.

Lupinus laxiflorus var. *calcaratus* (Kell.) C. P. Smith, Bull. Torrey Club 51: 304. 1924. (*Lupinus calcaratus* Kell. Proc. Calif. Acad. 2: 195. 1862; *Lupinus multinctus* A. Nels. Bot. Gaz. 53: 221. 1912; *Lupinus variegatus* Heller, Muhlenbergia 8: 89. 1912.) Calyx-spur 1–3 mm. long, often all of calyx except lower lip colored like the petals; petals all pale yellow, or some white or yellow and some rose or violet, rarely all blue. Open hillsides, Arid Transition Zone; Nevada and western Utah (Mount Ibapah) to southern Idaho and eastern Oregon and northwestern California, east of the Sierra Nevada Divide. Type locality: not given, but probably western Nevada.

Lupinus laxiflorus var. *silvicola* (Heller) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 527. 1925. (*Lupinus silvicola* Heller, Muhlenbergia 6: 81. 1910.) Calyx-spur evident, but scarcely 1 mm. long, flowers only 8–9 mm. long, petals mostly blue, violet-tinged. Open forests, Upper Transition Zone; Mariposa County, California, to Lane and Wheeler Counties, Oregon. Type locality: Summit, Placer County, California.

Lupinus laxiflorus var. *cognatus* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 527. 1925. Flowers 10–13 mm. long; upper calyx-lip largely concealed by the reflexed sides of the broad, short-clawed banner. Mountain sides, Upper Transition Zone; Baker and Grant Counties, Oregon, to Modoc County, California, also in the San Gabriel Mountains of Los Angeles County, California. Type locality: Wallowa Mountains, northeastern Oregon.

31. *Lupinus inyoensis* Heller. Inyo Spurred Lupine. Fig. 2590.

Lupinus inyoensis Heller, Muhlenbergia 2: 211. 1906.

Pubescent with short spreading hairs, stems slender, 5–6 dm. tall, with few or no long-petioled lower leaves at flowering time, petioles 4–8 cm. long, leaflets about 8, oblanceolate, densely subappressed-pubescent on both sides; peduncles 3–4 cm. long, racemes 5–10 cm. long; flowers 12–14 mm. long, bracts early deciduous, pedicels about 4 mm. long, spreading-pubescent; calyx short-spurred, upper lip bidentate, lower entire; petals pale violet or blue, banner as wide as long, usually glabrous, keel ciliate above; pods and seeds not seen.

Sandy soil, among low shrubs, Upper Sonoran Zone; Sierra foothills of Inyo County, California. Type locality: McGee Meadows, west of Bishop, Inyo County, California. May–June.

Lupinus inyoensis var. *ericalyx* C. P. Smith, in Jepson, Man. Fl. Pl. Calif. 527. 1925. Plants 10–30 cm. tall; racemes 4–8 cm. long, compact, pedicels 1–2 mm. long, flowers 10–11 mm. long; calyx woolly-villous; banner woolly-pubescent on the back. Dry soil, Canadian Zone; high Sierra Nevada, Madera County to Inyo County, California. Type locality: dry summits east of Minarets, Madera County, California.

Lupinus inyoensis var. *demissus* C. P. Smith, Bull. Torrey Club 51: 304. 1924. Plants 1–3 dm. tall; racemes 3–4 cm. long, compact; pedicels 2 mm. long, flowers 8–10 mm. long; calyx merely gibbous, not woolly; banner suborbicular, glabrous. Transition Zone; known only from the type. Type locality: talus slope, Wallowa Mountains, Baker County, Oregon.

32. *Lupinus caudatus* Kell. Kellogg's Spurred Lupine. Fig. 2591.

Lupinus caudatus Kell. Proc. Calif. Acad. 2: 197. 1862.

Lupinus argentinus Rydb. Bull. Torrey Club 30: 257. 1903.

Appressed-silky or -satiny, subdecumbent to erect, 2–5 dm. tall. Lower leaves long-petioled, silky on both sides, often densely silvery, petioles 3–8 cm. long, leaflets 5–7, oblanceolate, 2–5 cm. long; peduncles 2–5 cm. long, racemes 5–15 cm. long; flowers 10–14 mm. long, scattered or subverticillate, pedicels 3–4 mm. long, appressed-pubescent; calyx-spur about 1 mm. long, upper lip bidentate, lower entire; petals violet-blue or rarely white, banner silky on the back, wings glabrous or with a few stray cilia on the sides near the claw, keel ciliate on the upper edges; pods 25–30 mm. long, silky; ovules 5 or 6, seeds about 4 mm. long, reddish brown to flesh-pink.

Exposed hillsides, Upper Sonoran Zone; eastern Oregon and southern Idaho to Utah, Nevada, and adjacent California. Type locality: not given, but probably western Nevada. May–Sept.

Lupinus caudatus var. *subtenellus* C. P. Smith, Bull. Torrey Club 51: 304. 1924. Leaflets linear, short-hairy, decidedly greenish; racemes loosely flowered; flowers 8–10 mm. long, pedicels more slender, 3–5 mm. long. Transition Zone; Deschutes and Lake Counties, Oregon. Type locality: Paulina Lake, Deschutes County, Oregon.

Lupinus caudatus var. *rubricaulis* (Greene) C. P. Smith, Contr. Dudley Herb. 1: 29. 1927. (*Lupinus rubricaulis* Greene, Pl. Baker. 3: 35. 1901.) Foliage distinctly greenish, leaflets oblanceolate; calyx-spur not pronounced. Transition Zone; Colorado and eastern Oregon. Type locality: Crested Butte, Gunnison County, Colorado.

33. *Lupinus holosericeus* Nutt. Nuttall's Silky Lupine. Fig. 2592.

Lupinus holosericeus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 380. 1840.

Appressed-silky, subdecumbent to erect, 2-4 dm. tall. Lower leaves long-petioled, silky on both sides, petioles 3-17 mm. long, leaflets 5-9, oblanceolate, acute at apex, 2-4 cm. long; peduncles 2-3 cm. long, racemes 8-15 cm. long; flowers 7-10 mm. long, scattered or subverticillate, pedicels 3-4 mm. long, appressed-pubescent, bracts deciduous; calyx not spurred, scarcely gibbous, upper lip bidentate, lower entire or tridentate; petals blue or lilac, banner silky, 15-20 mm. long, about 6 mm. wide; ovules 3-4, seeds flesh-colored, about 4 mm. long.

Sagebrush plains, Upper Sonoran and lower edge of the Transition Zones; intermontane Oregon, Washington, and Idaho; Type locality: "islands and gravelly banks of the Wahlamet," where evidently not now existing. (Cf. Contr. Dudley Herb. 1: 30. 1927.) June-Aug.

Lupinus holosericeus var. *amblyophyllus* (Robinson) C. P. Smith, Bull. Torrey Club 51: 304. 1924. (*Lupinus canescens* var. *amblyophyllus* Robinson, Contr. U.S. Nat. Herb. 11: 354. 1906.) Leaflets elliptic-lanceolate, rounded at apex, 25-35 mm. long. Known only from the type collection. Type locality: Egbert Springs, Douglas County, Washington.

34. *Lupinus meionanthus* A. Gray. Gray's Many-flowered Lupine. Fig. 2593.

Lupinus meionanthus A. Gray, Proc. Amer. Acad. 6: 522. 1865.

Densely subappressed-silky, woody at base only, erect or ascending, 3-6 dm. tall. Leaves many, all short-petioled, silky on both sides, petioles 20-35 mm. long, leaflets 6-9, oblanceolate, 12-20 mm. long; peduncles about 3 cm. long, racemes 5-10 cm. long, densely flowered; flowers about 6 mm. long, pedicels 3 mm. long, appressed-pubescent, bracts deciduous; calyx-lips obscurely notched or tridentate; petals blue or lilac, banner glabrous, suborbicular, yellow in the center, keel ciliate on the upper edges, the acumen short, broad, and obtuse; fruit not seen.

Mountain forests and open slopes, Canadian and Hudsonian Zones; Madera and Tuolumne Counties to Plumas County, California, and adjacent Nevada. Type locality: Nevada, near Carson City. June-Aug.

35. *Lupinus sulphureus* Dougl. Sulphur-flowered Lupine. Fig. 2594.

Lupinus sulphureus Dougl. ex Hook. Fl. Bor. Amer. 1: 166. 1830.

Appressed-silky, erect, 4-10 dm. tall. Lower leaves long-petioled, pubescent both sides yet greenish, petioles 4-20 cm. long, leaflets 9-15, narrowly-oblanceolate, acute at apex, 3-6 cm. long; peduncles 3-6 cm. long, racemes 10-20 cm. long, rather dense; flowers 10-12 mm. long, scattered or subverticillate, pedicels 4-8 mm. long, usually appressed-pubescent, bracts deciduous; calyx scarcely to strongly gibbous, upper lip bidentate, lower entire; petals pale sulphur-yellow, rarely bluish, banner more or less pubescent on the back, wings glabrous, keel ciliate on upper edges; pods silky, 2-3 cm. long, ovules about 4, seeds not seen.

Dry slopes, Transition Zone; Blue Mountains of Washington and Oregon, also adjacent Idaho. Type locality: "Blue Mountains of Northwest America, on elevated grounds near the source of Clark's River." May-Aug.

36. *Lupinus leucopsis* Agardh. Big Bend Lupine. Fig. 2595.

Lupinus leucopsis Agardh, Syn. Gen. Lup. 29. 1835.

Appressed-silky, erect, branched, 3-8 dm. tall. Lower leaves long-petioled, all densely silky both sides, petioles slender, upper about as long as their leaflets, leaflets 5-8, conduplicate, linear-oblanceolate, acute, largest 40-50 mm. long, racemes 6-12 mm. long, verticils 6-10, bracts deciduous, pedicels 2-4 mm. long, loosely appressed-pubescent; flowers spreading or ascending, 10-12 mm. long, calyx densely appressed-silky, subsymmetrical or subgibbous, upper lip bidentate, lower entire; petals violet-blue or pale purple, banner hardly reflexed, glabrous, wings glabrous, keel arcuate, its lower bend somewhat exposed; pods 20-25 mm. long, 5-6 mm. wide, ovules 4 or more, seeds not seen.

Open ground, Upper Sonoran Zone; Douglas and Grant Counties, "Big Bend Country," Washington. Type locality: "North West America." April-June.

Lupinus leucopsis var. *dubius* C. P. Smith, Sp. Lup. 111. 1939. (*Lupinus bingenensis* var. *dubius* C. P. Smith, Bull. Torrey Club 51: 305. 1924.) Leaflets flat, greenish-silky, radially spreading, largest seen 70 mm. long; petioles ascending; keel ciliate. Hillsides, Upper Sonoran Zone; Benton, Yakima, and Kittitas Counties, Washington. Type locality: Prosser, Benton County, Washington.

Lupinus leucopsis var. *Hendersonianus* C. P. Smith, Sp. Lup. 111. 1939. Leaflets flat, suberect, subsilky when mature, upper greener, largest 40-50 mm. long, 8-10 mm. wide; petioles erect, parallel with stem; keel ciliate. Hendricks Park, Eugene, Lane County, Oregon.

Lupinus leucopsis var. *shermanensis* C. P. Smith, Sp. Lup. 111. 1939. Leaflets flat, sometimes suberect, obtuse, densely silky both sides, largest seen 30-35 mm. long, 5-6 mm. wide; petioles almost erect; keel ciliate. Columbia River Highway near Biggs Junction, Sherman County, Oregon.

Lupinus leucopsis var. *bingenensis* (Suksdorf) C. P. Smith, Sp. Lup. 112. 1939. (*Lupinus bingenensis* Suksdorf, Werdenda 1: 12. 1923.) Keel non-ciliate; stems appressed-pubescent. Upper Sonoran Zone; Bingen, Washington, and Hood River, Oregon. Type locality: Bingen, Klickitat County, Washington.

Lupinus leucopsis var. *möllis* (Heller) C. P. Smith, Sp. Lup. 112. 1939. (*Lupinus mollis* Heller, Muhlenbergia 8: 105. 1912.) Keel non-ciliate; stems spreading-pubescent. Dry hills, Lower Arid Transition Zone; Wasco and Sherman Counties, Oregon, and Kittitas County, Washington. Type locality: The Dalles, Wasco County, Oregon.

37. *Lupinus nevadensis* Heller. Nevada Lupine. Fig. 2596.

Lupinus nevadensis Heller, Muhlenbergia 6: 107. 1910.

More or less villous with spreading or ascending hairs, erect or ascending, 3-4 dm. tall. Lower leaves long-petioled, densely villous below, more greenish above, petioles 3-15 cm. long, leaflets 7-9, oblanceolate, acute at apex, 3-4 cm. long; peduncles 3-6 cm. long, racemes 1-2 dm.

long; flowers 10–12 mm. long, subverticillate, pedicels 5–7 mm. long, with the deciduous bracts densely villous; calyx scarcely gibbous, upper lip cleft, lower tridentate; petals violet-purple, banner glabrous, the whitish center turning brown, wings glabrous, keel arcuate, ciliate on upper edges of acumen and middle; pods and seeds not seen.

Sagebrush areas, Upper Sonoran Zone; Harney County, Oregon, to western Nevada. Type locality: Truckee Pass, Washoe County, Nevada. May–June.

38. *Lupinus corymbosus* Heller. Corymbose Lupine. Fig. 2597.

Lupinus corymbosus Heller, Muhlenbergia 2: 69. 1905.

Sparsely appressed-pubescent, erect, branched above, 3–6 dm. tall. Leaves many, short-petioled, glabrate above, more or less silvery-silky below; petioles 2–3 cm. long, leaflets 5–7, linear-oblongate; peduncles 2–3 cm. long, racemes 7–12 cm. long, lax or compact; flowers 10–13 mm. long, scattered or subverticillate, pedicels 3–6 mm. long, appressed-pubescent; calyx more or less gibbous, upper lip notched, lower entire; petals blue or lilac, banner more or less pubescent on the back, 9–12 mm. wide, wings glabrous, keel usually ciliate on the upper margins, sometimes non-ciliate, the acumen much upturned; pods appressed-silky, 20–25 mm. long by 5 mm. wide, ovules 2–4, seeds about 4 mm. long, pale or dark flesh-colored, mostly unmarked.

Sagebrush plains, Upper Sonoran Zone; eastern Oregon, northern Nevada, and northeastern California. Type locality: Montague, Siskiyou County, California. June–Sept.

39. *Lupinus tenellus* Dougl. Douglas' Slender Lupine. Fig. 2598.

Lupinus tenellus Dougl. ex G. Don, Gen. Hist. Pl. 2: 367. 1832.

Sparsely appressed-silky, stems very slender, unbranched, erect or ascending, 3–6 dm. tall. Leaves short-petioled, glabrate above, thinly pubescent below, petioles 3–4 cm. long, leaflets 5–7, linear, falcate, 3–4 cm. long; peduncles 3–4 cm. long, racemes 10–15 cm. long, lax; flowers 8–10 mm. long, scattered, pedicels 3–5 mm. long, slender, appressed-pubescent; calyx hardly gibbous, the lips entire, slender; petals violet-blue, banner somewhat hairy dorsally, suborbicular, wings glabrous, keel much curved, ciliate on the upper edge of acumen and middle; fruit not seen.

Dry gravelly plain, Arid Transition Zone; Mill Plain (Fort Vancouver), Clark County, Washington. Type locality: North America, on the western coast, as given by Don; Fort Vancouver, as given by Douglas' label with type specimen. Evidently very local, perhaps now extinct.

40. *Lupinus oreganus* Heller. Oregon Lupine. Fig. 2599.

Lupinus oreganus Heller, Muhlenbergia 7: 89. 1911.

Lupinus amabilis Heller, op. cit. 8: 114. 1912.

Thinly appressed-silky, scarcely branched, erect, 4–6 dm. tall. Lower leaves long-petioled, scattered, glabrous above, petioles 5–15 cm. long, leaflets about 10, oblongate, acute at apex, 4–8 cm. long, 7–12 mm. wide; peduncles 5–10 cm. long, racemes 15–25 cm. long; flowers 10–12 mm. long, scattered or subverticillate, pedicels 7–12 mm. long, appressed-pubescent; calyx scarcely gibbous, upper lip notched, largely concealed by reflexed sides of banner, lower lip entire; petals blue or purplish, banner glabrous or scantily pubescent on the back, wings glabrous, keel falcate, non-ciliate; pods and seeds not seen.

Dry hills, Arid Transition Zone; Willamette Valley, south to Myrtle Creek, Douglas County, Oregon. Type locality: Eugene, Lane County, Oregon. April–June.

Lupinus oreganus var. *Kincaidii* C. P. Smith, Bull. Torrey Club 51: 305. 1924. Upper calyx-lip short, not concealed by the reflexed sides of the long-clawed banner. Known only from the type. Type locality: Corvallis, Benton County, Oregon.

Lupinus oreganus var. *pusillus* C. P. Smith, Bull. Torrey Club 51: 305. 1924. Plants 1–2 dm. tall; flowers 8–9 mm. long, pedicels about 3 mm. long, spreading-pubescent; upper calyx-lip entirely exposed. Known only from the type. Type locality: dry thicket, 13 miles southwest of Waldo, Josephine County, Oregon.

41. *Lupinus Biddlei* Henderson. Biddle's Lupine. Fig. 2600.

Lupinus Biddlei Henderson ex C. P. Smith, Sp. Lup. 108. 1939.

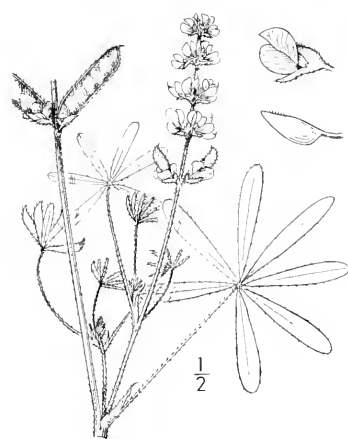
Plant 3–5 dm. tall, stems fistulose, nerved, unbranched, glabrate. Leaves few as to both basal and caudal, pale green, glabrous above, loosely subsilky below, lower petioles stoutish, 10–18 cm. long, leaflets 7–9, flat when mature, obtuse and apiculate, widely oblongate or widest at the middle, largest seen 40 mm. long, 15 mm. wide; peduncles fistulose, 2–10 cm. long, racemes 10–20 cm. long, verticils crowded, 10–20, bracts 3–5 mm. long, subsistent, pedicels 5–12 mm. long, spreading-pubescent, usually ascending; flowers 10–12 mm. long, spreading or ascending, rarely drooping; calyx loosely silky, subsymmetrical at base, both lips entire, the lower spreading-pubescent; petals blue or white, banner glabrous, often wider than long, very little reflexed, wings wide, covering keel, keel arcuate, non-ciliate; pods pale brown, loosely silky, spreading or ascending, 30–40 mm. long, 8–10 mm. wide, ovules 4–6, seeds not seen.

Dry sagebrush plains or slopes, Upper Sonoran Zone; Harney and Malheur Counties, Oregon. Type locality: Alvord, Harney County, Oregon. May–June.

42. *Lupinus mucronulatus* Howell. Howell's Waldo Lupine. Fig. 2601.

Lupinus mucronulatus Howell, Erythra 1: 109. 1893.

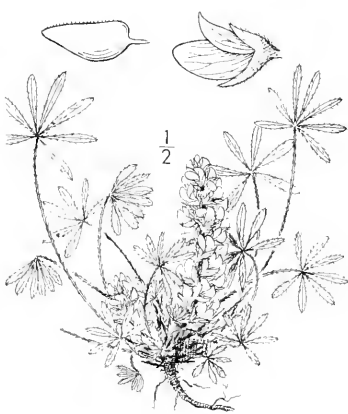
Thinly appressed-pubescent, erect or decumbent, unbranched, 1–2 dm. tall. Leaves long-petioled, glabrous above or glabrate on both sides, petioles 7–12 cm. long, leaflets 6–10, thickish, obovate to oblongate, obtuse or broadly acute at apex, 3–5 cm. long, 8–10 mm. wide; peduncles 7–12 cm. long, racemes 5–10 cm. long, rather dense; flowers 10–11 mm. long, subverticillate, pedicels slender, 4–5 mm. long, appressed-pubescent, bracts deciduous; calyx not gibbous, upper lip notched, lower obscurely tridentate; petals purplish or yellowish, becoming brown, banner



2582



2583



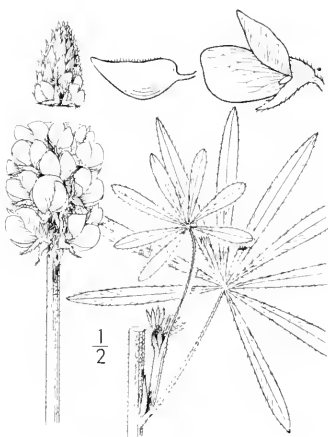
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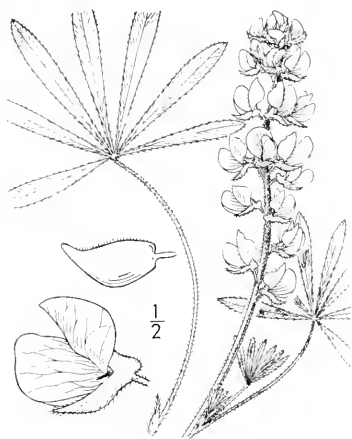


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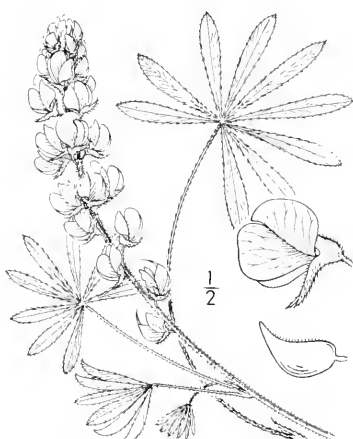
2582. *Lupinus micranthus*
2583. *Lupinus Lyallii*
2584. *Lupinus caespitosus*

2585. *Lupinus aridus*
2586. *Lupinus lepidus*
2587. *Lupinus pratensis*

2588. *Lupinus hypolasius*
2589. *Lupinus laxiflorus*
2590. *Lupinus inyoensis*



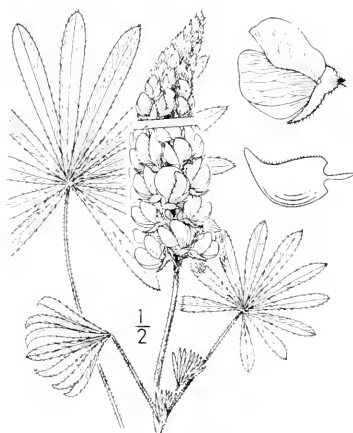
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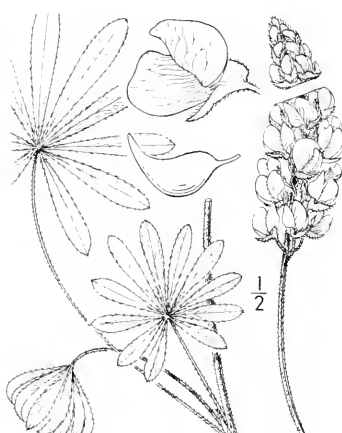
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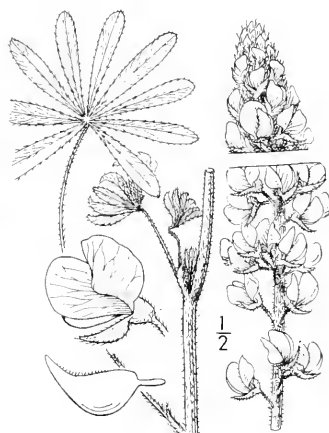
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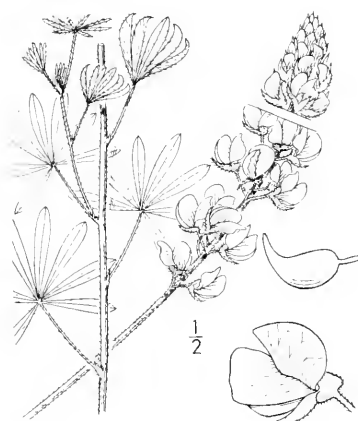
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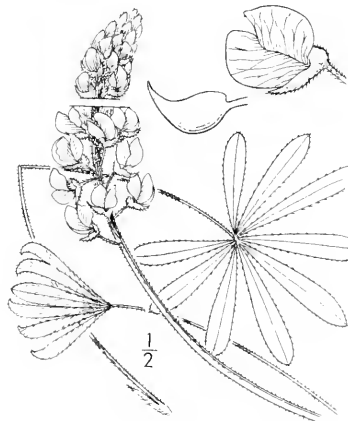
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2591. *Lupinus caudatus*
 2592. *Lupinus holosericeus*
 2593. *Lupinus meionanthus*

2594. *Lupinus sulphureus*
 2595. *Lupinus leucopsis*
 2596. *Lupinus nevadensis*

2597. *Lupinus corymbosus*
 2598. *Lupinus tenellus*
 2599. *Lupinus oreganus*

glabrous, with dark center, wings glabrous, keel much curved, ciliate on upper edges of acumen; pods and seeds not seen.

Dry hills, Arid Transition Zone; near Waldo and Kerbyville, Josephine County, Oregon. Type locality: eastern side of the Coast Range near Waldo, Oregon. April–June.

Lupinus mucronulatus var. *umatillensis* C. P. Smith, Sp. Lup. 108. 1939. Bracts persistent, often longer than the pedicels; leaflets narrower, widest near the middle, leaves few, largely crowded near the base of the stem. Table Rock, Umatilla County and National Forest, Oregon.

43. *Lupinus onustus* S. Wats. Plumas Lupine. Fig. 2602.

Lupinus onustus S. Wats. Proc. Amer. Acad. 11: 127. 1876.

Lupinus pinetorum M. E. Jones, Contr. West. Bot. No. 8: 25. 1898.

Lupinus violaceus Heller, Muhlenbergia 2: 65. 1905.

Sparsely appressed-silky, slender, decumbent, 15–20 cm. tall. Leaves few, long-petioled, appressed-silky below, glabrous above, petioles 5–10 cm. long, leaflets 5–8, oblanceolate, acute or obtuse, 25–40 mm. long; peduncles 5–8 cm. long, racemes 5–15 cm. long, few-flowered; flowers 8–11 mm. long, scattered, pedicels about 3 mm. long, appressed-pubescent, bracts short, deciduous; calyx scarcely gibbous, upper lip notched, lower entire; petals deep blue, banner and wings glabrous, keel nearly straight on upper ciliated edges; pods 35–40 mm. by 12 mm., sub-silky, ovules 5 or 6, seeds brown, 6–7 mm. long by 6 mm. broad.

Open pine woods, Transition Zone; Plumas, Lassen, and Siskiyou Counties, California. Type locality: Indian Valley, Plumas County, California. April–June.

Lupinus alilattissimus C. P. Smith, Sp. Lup. 148. 1940. Plant 6–9 dm. tall, stems slender, widely branched, nerved, minutely spreading-pubescent; leaves large, green, the upper smaller and long-petioled, about three times their leaflets, the middle leaves largest, their petioles hardly twice their leaflets, leaflets glabrate both sides, stipules inconspicuous, hardly 3 mm. long, the free part deciduous, leaflets 7–9, largest 70–80 mm. long, 20–25 mm. wide, radiating, flat, largely obtuse, widely oblanceolate or widest at the middle; racemes 20–30 cm. long, verticils 8–12, well separated; bracts caducous, pedicels ascending, spreading-pubescent, 2–6 mm. long; flowers spreading or ascending, 10–12 mm. long, calyx subsymmetrical, minutely spreading-pubescent, upper lip deeply bidentate, almost cleft, lower entire or minutely bidentate; petals bluish or brownish, banner glabrous, suborbicular, subreflexed, median yellow spot changing to purple, wings hardly covering lower bend of the arcuate non-ciliate keel; pods 35–40 mm. long, dull tawny-yellow, ovules 4–5. Type locality: hills north of Redding, Shasta County, California.

Lupinus Thompsonianus C. P. Smith, Sp. Lup. 149. 1940. Erect, 3–4 dm. tall, stems very slender, unbranched, glabrate; leaves green, glabrate both sides, lowest primary very small, mostly deciduous at flowering time, stipules 3–4 mm. long, mostly free, petioles slender, 30–60 mm. long, leaflets 5–8, flat, radiating, acute, widest at the middle, largest 30 mm. long, 10 mm. wide; racemes 8–15 mm. long, verticils 8–12, bracts deciduous, pedicels appressed-pubescent, 3–5 mm. long; flowers 8–10 mm. long, calyx appressed-pubescent, subgibbous at base, upper lip bidentate, lower entire; petals pale, bluish or purplish, banner suborbicular, little reflexed, wings 5–6 mm. wide, covering the non-ciliate, arcuate keel; pods not seen. Type locality: rocky ground, Douglas Park, Del Norte County, California.

44. *Lupinus Breweri* A. Gray. Brewer's Lupine. Fig. 2603.

Lupinus Breweri A. Gray, Proc. Amer. Acad. 7: 334. 1867.

Appressed-silvery-silky, shrubby, low, prostrate or decumbent, branched and matted, growth of season 2–15 cm. long. Leaves many, crowded basally or scattered along the stem, petioles 1–5 cm. long, leaflets 7–10, spatulate to oblanceolate, 5–20 mm. long; peduncles 1–3 cm. long, racemes usually densely flowered, 3–5 cm. long; flowers 7–10 mm. long, sometimes scattered, pedicels 1–3 mm. long; bracts deciduous; upper calyx-lip cleft, lower entire or tridentate; petals violet, banner obovate to suborbicular, center yellowish or white, back glabrous or pubescent near middle, keel straight on upper edges where non-ciliate or with a few cilia; pods about 12 mm. long, silky, ovules 3 or 4, seeds 3–4 mm. long, flesh-colored, marked with olive-brown.

Rocky mountain tops or gravelly levels, Upper Arid Transition to Canadian Zones; Siskiyou Mountains, southern Oregon, to the San Bernardino Mountains, southern California. Type locality: "Prostrate, trailing on the ground, or on rocks on the Yosemite trail, alt. 6,000 feet." June–Sept.

Lupinus Breweri var. *párvulus* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 526. 1925. Stems as above; racemes usually subcapitate, scarcely exceeding the foliage; flowers 5–7 mm. long. Canadian Zone; Nevada County, California, and adjacent Nevada, to Ventura County, California. Type locality: Gold Lake, Sierra County, California.

Lupinus Breweri var. *bryoides* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 526. 1925. Season's growth barely 1 cm. long; petioles about 1 cm. long, leaflets about 5 mm. long; flowers 4–6 mm. long; whole plant suggesting a congested mass of coarse moss. Boreal Zones; Tulare and Ventura Counties, California. Type locality: Olancha Mountain, Tulare County, California.

Lupinus Breweri var. *grandiflorus* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 526. 1925. Stems about 1 cm. long, leaves crowded at the base, their petioles 4–6 cm. long; racemes exceeding the foliage; flowers scattered, 11–12 mm. long, the banner more reflexed than usual for this species. Type locality: Mono Craters, Mono County, California.

Lupinus Breweri var. *Clokeyanus* C. P. Smith, Sp. Lup. 150. 1940. Peduncles 3–8 cm. long, racemes 3–10 cm. long, verticils 4–8, the lowest remote; legumes ascending or suberect, 12–14 mm. long, 7–8 mm. wide, with 2 or 3 ovules, but usually just one seed. A conspicuous variation of the usual *L. Breweri*. Type locality: Bear Lake, San Bernardino Mountains and County, California.

Lupinus crassulus Greene, Muhlenbergia 8: 118. 1912. Glabrate to loosely villous, low, suffrutescent, much branched, prostrate or decumbent, growth of season 10–15 cm. long, succulent. Leaves many, loosely villous, scattered along the stem, petioles 1–5 cm. long, leaflets 5–7, spatulate to suboval, 10–20 mm. long; peduncles 1–3 cm. long, racemes 3–4 cm. long, rather densely flowered; flowers mostly scattered, 8–10 mm. long, pedicels about 1 mm. long, spreading-villous, bracts subsistent, subulate, much exceeding the young buds in the immature raceme; petals largely blue, the banner bright yellow in center, keel ciliate on the upper edges; pods and seeds not seen. Boreal Zones; known only from the type collection, taken near Sonora Peak, at 10,500 feet, Stanislaus County, California.

45. *Lupinus Peirsonii* H. L. Mason. Peirson's Lupine. Fig. 2604.

Lupinus Peirsonii H. L. Mason, Madroño 1: 187. 1928.

Appressed silvery-silky, 3–6 dm. tall, stems ascending. Leaves subbasal, long-petioled, densely

silky on both sides; petioles 6–15 cm. long, stipules 15–20 mm. long, over half adnate; leaflets 5–8, cuneate to oblong-lanceolate or lanceolate, obtuse and apiculate, 40–70 by 10–15 mm.; peduncles 10–25 cm. long, stout; racemes 10–15 cm. long, lower verticils distinct; flowers 10–12 mm. long, subverticillate, spreading or ascending; pedicels 1–1.5 mm. long, appressed-sericeous, floral bracts caducous, about 5 mm. long; calyx subsymmetrical, upper lip tridentate, lower shortly tridentate; petals pale yellow, persistent in fruit, banner pubescent on back near apex, with a brown spot between center and apex, very little reflexed from wings, wings rather narrow, usually not covering lower bend of keel, keel ciliate on upper edges; pods appressed-silky, ovules 5, seeds not seen.

Gravelly sides or floors of canyons, Upper Sonoran Zone; Mojave slopes of the San Gabriel and Tehachapi Mountains, Los Angeles and Kern Counties, California. Type locality: Rock Creek, San Gabriel Mountains. April.

46. *Lupinus leucophyllus* Dougl. Woolly-leaved Lupine. Fig. 2605.

Lupinus leucophyllus Dougl. ex Lindl. Bot. Reg. 13: pl. 1124. 1827.

Lupinus plumosus Dougl. ex Lindl. op. cit. 15: pl. 1217. 1829.

Lupinus leucophyllus plumosus Robinson ex Coville, Contr. U.S. Nat. Herb. 11: 354. 1906.

Woolly-canescens and more or less villous, often densely so, stout, erect, branched, 6–9 dm. tall. Leaves many, woolly on both sides, lower long-petioled, petioles 3–15 cm. long, leaflets 7–9, oblanceolate, 3–6 dm. long; peduncles 3–8 cm. long, racemes 8–30 cm. long, usually dense and cylindrical; flowers crowded, 12–14 mm. long, pedicels 1–2 mm. long, densely spreading-pubescent, bracts usually persistent, shorter or longer than the buds; calyx often gibbous, upper lip bidentate or lobed, lower entire or obscurely toothed; petals white, pinkish, bluish, or purple, often turning brown, banner small, ovate or oblong, acute or rounded at apex, pubescent on the back, keel stout, ciliate on the upper margins; pods woolly, 20–25 mm. long, ovules 3–6, seeds reddish brown and obscurely mottled or drab and gray spotted.

Dry soils, Upper Sonoran and Arid Transition Zones; eastern Washington and western Montana to central Utah and northern California (Lassen, Trinity, and Colusa Counties). Type locality: "from the Great Falls of the Columbia in North America to the Sources of the Missouri among the Rocky Mountains." May–July.

Lupinus leucophyllus var. *Bélliae* C. P. Smith, Bull. Torrey Club 51: 305. 1924. Flowers only 8–10 mm. long; stems more or less villous. Upper Sonoran Zone; northern California and eastern Washington to central Montana. Type locality: Crystal Creek, Power County, Idaho.

Lupinus leucophyllus var. *canescens* (Howell) C. P. Smith, Bull. Torrey Club 51: 306. 1924. (*Lupinus canescens* Howell, Erythea 1: 110. 1893.) Flowers 8–10 mm. long; racemes densely or loosely flowered; stems without the spreading hairs. Upper Sonoran and Arid Transition Zones; eastern Washington to Modoc County, California. Type locality: western base of Buck's Mountain, a spur of the Blue Mountains of Oregon.

Lupinus leucophyllus var. *tenuispicus* (A. Nels.) C. P. Smith, Bull. Torrey Club 51: 306. 1924. (*Lupinus tenuispicus* A. Nels. Bot. Gaz. 54: 410. 1912.) Flowers only 6–7 mm. long; banner suborbicular; racemes very slender, many-flowered; pubescence very short, but more or less spreading and tangled. Upper Sonoran Zone; western Idaho and eastern Oregon.

Lupinus retrorsus Henderson, Bull. Torrey Club 27: 344. 1900. Villous with long, spreading or retrorse hairs, stout, erect, simple or branching, 6–9 dm. tall. Leaves long-petioled, glabrate above, or subvillous on both sides, deep green above, paler below, petioles 15–22 cm. long, villous and short-hairy; leaflets 9–11, oblanceolate, 4–10 cm. long; racemes 6–35 cm. long, often dense; flowers 8–12 mm. long, whorled or spirally arranged, pedicels 1–4 mm. long, spreading-pubescent, bracts persistent, villous, long; calyx gibbous, woolly-villous, upper lip bidentate, lower entire or tridentate; banner broadly-obovate, pubescent on the back, keel ciliate on the upper edges; pods villous, 2 cm. long, ovules 5–6, seeds pinkish brown, dotted with darker. Moist woods or grassy hills, Transition Zone; Benewah and Kootenai Counties, Idaho, to Stevens County, Washington. Type locality: hills of Coeur d'Alene Lake, opposite Harrison, Kootenai County, Idaho.

47. *Lupinus Chamissonis* Eschsch. Chamisso's Bush Lupine. Fig. 2606.

Lupinus Chamissonis Eschsch. Mém. Acad. St.-Petersb. 10: 288. 1826.

Lupinus Chamissonis var. *longebracteatus* S. Wats. Bot. Calf. 1: 117. 1876.

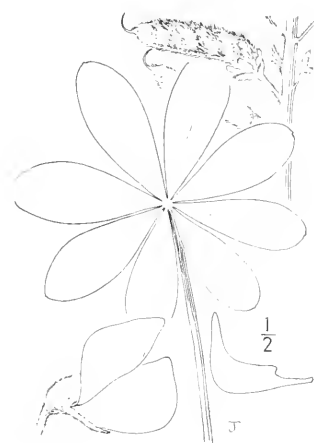
Minutely spreading-pubescent, often tomentose, an erect, branching shrub, 3–9 dm. tall. Leaves many, short-petioled, axillary clusters well-developed, petioles about 2 cm. long, leaflets 6–9, oblanceolate, silky on both sides, 12–25 mm. long by 4–6 mm. wide; peduncles 2–5 cm. long, racemes 6–15 cm. long; flowers 12–16 mm. long, scattered or subverticillate, pedicels 6–8 mm. long, spreading-pubescent, bracts early deciduous, long or short; upper calyx-lip cleft, lower entire; petals blue or lavender, banner with a yellow center, pubescent on the back near apex, keel arcuate, non-ciliate or with two or three stray cilia on upper edges; pods brown, sublanate, 30–35 mm. long by 8–10 mm. wide, ovules 6–7, seeds 4–5 mm. long, mottled or clouded with brown.

Coastal sand hills, Humid Transition Zone; San Francisco and Monterey to Los Angeles County, California. Type locality: "in arenosis novae Californiae." April–June.

48. *Lupinus albifrons* Benth. Bentham's Bush Lupine. Silver Lupine. White-foliaged Lupine. Fig. 2607.

Lupinus albifrons Benth. ex Lindl. Bot. Reg. 19: pl. 1642. 1833.

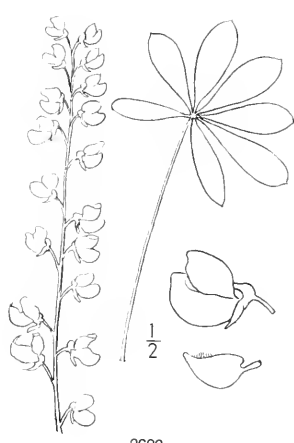
Appressed-silky, arborescent, often with a distinct woody trunk, much branched, 6–15 dm. tall. Leaves many, lower often long-petioled, petioles 2–8 cm. long, mostly longer than their leaflets, leaflets 7 to 10, oblanceolate to spatulate or obovate, acute or rounded at apex, 12–30 mm. long by 4–10 mm. wide, silvery-silky on both sides; peduncles 5–13 cm. long, racemes 8–30 cm. long; flowers 10–14 mm. long, largely verticillate, pedicels 4–8 mm. long, spreading-pubescent, bracts deciduous, more or less exceeding buds; upper calyx-lip cleft, lower entire; petals blue or purplish, banner more or less pubescent on the back near the apex, the white or yellow center early changing to violet, keel ciliate on upper edges of acumen, narrowed toward the base; pods



2600



2601



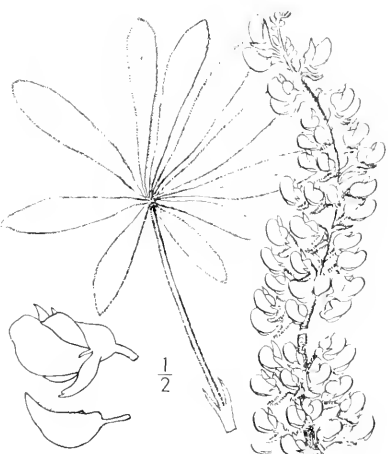
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2600. *Lupinus Biddlei*
2601. *Lupinus mucronulatus*
2602. *Lupinus onustus*

2603. *Lupinus Breweri*
2604. *Lupinus Peirsonii*
2605. *Lupinus leucophyllus*

2606. *Lupinus Chamissonis*
2607. *Lupinus albifrons*
2608. *Lupinus lapidicola*

dull yellow, 3–5 cm. long by about 8 mm. wide, ovules 5–9, seeds about 4 mm. long, mottled or spotted and usually with a marginal line.

Open hillsides and canyons, Upper Sonoran Zone; Sierra foothills and Coast Ranges, common. Type locality: California. April–June.

Lupinus albifrons var. *collinus* Greene, Fl. Fran. 46. 1891. (*Lupinus collinus* Heller, Muhlenbergia 2: 292. 1907.) Low and caespitose; leaves crowded basally and petioles more elongated; flowers averaging larger; keel often non-ciliate. Hills, Upper Sonoran Zone; Coast Ranges, Lake County to San Luis Obispo County, California. Type locality: San Francisco, rocky summits about the Presidio, and on the islands in the Bay.

Lupinus albifrons var. *Douglasii* (Agardh) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 531. 1925. (*Lupinus Douglasii* Agardh, Syn. Gen. Lup. 34. 1835; *Lupinus fallax* Greene, Erythea 2: 119. 1894.) Floral bracts much exceeding buds; leaflets 35–60 mm. long, linear-oblancoolate to oblong-oblancoolate. Open hillsides, Upper Sonoran Zone; Mount Tamalpais and coastal slopes south of Monterey, California. Type locality: not given, but evidently collected by Douglas near Monterey, California.

Lupinus albifrons var. *éminens* (Greene) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 531. 1925. (*Lupinus éminens* Greene, Erythea 1: 125. 1893; *Lupinus tricolor* Greene, op. cit. 1: 126. 1893; *Lupinus jucundus* Greene, Man. Bay Reg. 106. 1894; *Lupinus Brittonii* Abrams, Bull. N.Y. Bot. Gard. 6: 391. 1910; *Lupinus acutilobus* Heller, Muhlenbergia 8: 111. 1912.) Tall shrubs with petioles 1–2 times as long as the leaflets; pedicels appressed-pubescent; flowers 12–16 mm. long. Interior foothills and canyons, Upper Sonoran Zone; Corvallis, Oregon, to Lower California, reaching the coast only in southern California. Type locality: Santa Ynez Mountains, Santa Barbara County, California.

Lupinus albifrons var. *flumineus* C. P. Smith, Bull. Torrey Club 51: 306. 1924. Low shrub with small leaves, the petioles 3–4 times as long as the leaflets; pedicels appressed-pubescent. River banks and mountain sides, Upper Sonoran and Arid Transition Zones; Oregon City, Oregon, to Siskiyou County, California. Type locality: Salem, Marion County, Oregon. This is the *Lupinus holosericeus* of Howell, Piper, and others, not of Nuttall, as described by Torrey and Gray.

Lupinus albifrons var. *fissicalyx* (Heller) C. P. Smith, Contr. Dudley Herb. 1: 39. 1927. (*Lupinus fissicalyx* Heller, Muhlenbergia 8: 113. 1912.) Appressed-silky, not shrubby; petioles about 4 cm. long; flowers 12–15 mm. long, whorled, pedicels 5–7 mm. long, spreading-pubescent; keel slender, strongly arcuate, more or less ciliate on upper edges of acumen; seeds typical of the species. Upper Sonoran and Arid Transition Zones; Grants Pass, Gold Hill, and Jefferson, western Oregon. Type locality: Grants Pass, Josephine County, Oregon.

49. *Lupinus lapidicola* Heller. Heller's Dwarf Lupine. Fig. 2608.

Lupinus lapidicola Heller ex C. P. Smith, Bull. Torrey Club 51: 306. 1924.

Appressed-silky, abbreviated, subalpine dwarf, scarcely 1 dm. tall. Leaves crowded basally, silky on both sides, petioles slender, 20–45 mm. long, leaflets 7–8, oblancoolate, acute at apex, about 10 mm. long; peduncles scape-like, erect or ascending, 5–8 cm. long, racemes subcapitate, of 2 or 3 well separated verticils, about 4 cm. long; flowers few, 10–12 mm. long, pedicels 2–3 mm. long, appressed-silky, bracts subsistent; calyx silky, upper lip notched, lower minutely tridentate; petals blue or purple, banner with a dull yellow center, glabrous or somewhat pubescent on the back, keel ciliate on the upper edges or non-ciliate, only the short acumen upturned; pods and seeds not seen.

Gravelly slopes, Hudsonian Zone; Mount Eddy, Siskiyou County, California. Known only from the type collection. July.

50. *Lupinus ornatus* Dougl. Ornate Lupine. Fig. 2609.

Lupinus ornatus Dougl. ex Lindl. Bot. Reg. 14: pl. 1216. 1828.

Lupinus amphibia Suksdorf, Werdenda 1: 13. 1923.

Appressed-silvery-silky, simple or branched above, erect or ascending, 2–6 dm. tall. Leaves cauline, the lower often long-petioled, silvery-silky on both sides, usually densely so; petioles 2–10 cm. long, leaflets 5–8, oblancoolate, acute or obtuse at apex, 2–5 cm. long; peduncles 2–4 cm. long, often equalled by the upper leaves, racemes 4–15 cm. long, the verticils approximate; flowers 11–14 mm. long, pedicels 3–5 mm. long, appressed-silky, bracts deciduous; calyx silky, upper lip bidentate, lower entire; petals blue or lilac, banner suborbicular, glabrous or more or less hairy on the back, the center yellow, often turning brown, keel more or less curved, ciliate on upper edges toward apex; pods yellow, silky, about 25 by 7 mm., ovules 4–6, seeds pale flesh-colored, 5–6 mm. long.

Alluvial gravels, Upper Sonoran Zone; Columbia River Valley, Washington and Oregon. Type locality: "In mountain valleys, on the banks of the Spokane River, near Kettle Falls, on the River Columbia; and also near the chain of lakes of the last mentioned stream." June–Sept.

Lupinus ornatus var. *obtusilobus* (Heller) C. P. Smith, Bull. Torrey Club 51: 307. 1924. (*Lupinus obtusilobus* Heller, Muhlenbergia 8: 115. 1912.) Subdecumbent to ascending, 2–3 dm. tall; petioles 3–4 cm. long; pedicels more loosely appressed-pubescent; lower calyx-lip often tridentate, Hudsonian Zone; higher peaks of the northern Sierra Nevada of California (Mount Shasta, Mount Lassen, Mount Pleasant, Plumas County) and Snow Valley Peak, Ormsby County, Nevada. Type locality: Mount Shasta, California.

51. *Lupinus alpicola* Henderson. Mount Adams Lupine. Fig. 2610.

Lupinus alpicola Henderson ex Piper, Contr. U.S. Nat. Herb. 11: 355. 1906.

Appressed-subsilky, simple or nearly so, erect from a woody caudex, scaly at base, 3–5 dm. tall. Leaves cauline, scattered, the lower long-petioled, minutely appressed-hairy on both sides, petioles 3–20 cm. long, leaflets 7–11, linear-oblancoolate, acute at apex, 3–7 cm. long; peduncles 3–12 cm. long, racemes 7–15 cm. long; flowers 10–13 mm. long, scattered, bracts tardily deciduous, pedicels 4–7 mm. long, appressed-pubescent; calyx appressed-subsilky, upper lip bidentate, lower entire, slender; petals violet-blue, banner suborbicular, the center turning brown, the back sparingly pubescent near the middle, keel arcuate, ciliate on the upper margins; pods silky, 25–30 mm. long, ovules 4 or 5, seeds not seen.

Subalpine meadows and slopes, Hudsonian Zone; central Cascades, Bald Mountain, Yakima County, Washington, to Mount Hood, Oregon. Type locality: Mount Adams, Yakima County, Washington. July–Sept.

52. *Lupinus sericeus* Pursh. Pursh's Silky Lupine. Fig. 2611.

Lupinus sericeus Pursh, Fl. Amer. Sept. 2: 468. 1814.

Appressed-silky and more or less villous with spreading hairs, simple or branched, erect, 3–6 dm. tall. Leaves cauline, the lower long-petioled, silky on both sides, petioles 3–10 cm. long, leaflets 7–9, oblanceolate, acute at apex, 3–6 cm. long; peduncles 4–8 cm. long, racemes 12–15 cm. long, rarely densely flowered; flowers 8–12 mm. long, verticillate or scattered below, pedicels 4–6 mm. long, spreading-pubescent, bracts deciduous; upper calyx-lip bidentate, lower entire; petals purple, rose-colored, blue, creamy, or white, banner longer than broad, the back pubescent, keel arcuate or nearly straight, ciliate on the upper edges; pods 20–25 mm. long, yellow, seeds flesh-colored, unmarked, about 6 mm. long.

Dry hillsides and valleys, Upper Sonoran Zone; Utah and Wyoming to Montana and British Columbia. Common in central Washington. Only California locality, Gaspipe Springs, Mono County. Type locality: "On the banks of the Kooskoosky" (Clearwater River, Idaho). June–Aug.

Lupinus sericeus var. *flexuosus* (Lindl.) C. P. Smith, Bull. Torrey Club 51: 307. 1924. (*Lupinus flexuosus* Lindl. ex Agardh, Syn. Gen. Lup. 34. 1835; *Lupinus ornatus* var. *bracteatus* Robinson ex Piper, Contr. U.S. Nat. Herb. 11: 355. 1906; *Lupinus subulatus* Rydb. Bull. Torrey Club 34: 43. 1907.) Differing from the species in lacking the spreading hairs below the inflorescence, the pedicels spreading-pubescent; floral bracts often subsistent, equaling or exceeding the buds. Upper Sonoran and Arid Transition Zones; plains and rolling prairies, same range as the species. Type locality: "America Boreali-occidentali."

53. *Lupinus Abramsii* C. P. Smith. Abrams' Lupine. Fig. 2612.

Lupinus Abramsii C. P. Smith, Bull. Torrey Club 51: 308. 1924.

White-woolly-villous, decumbent, branched, 5–6 dm. tall. Leaves many, white-woolly on both sides, petioles short, 3–5 cm. long, leaflets 8–9, oblanceolate, acute or obtuse, 20–30 by 5–7 mm.; peduncles 6–10 cm. long, racemes 15–25 cm. long; flowers 14–16 mm. long, spreading, verticillate, bracts deciduous, villous, 10 mm. long, pedicels 4–7 mm. long, woolly-villous; calyx woolly, upper lip bifid, lower tridentate; petals broad, blue, banner suborbicular, pubescent on the back near apex, 15–16 mm. wide, with a yellow center, keel slightly curved, ciliate along acumen and middle; ovules 8–9, pods and seeds unknown.

Open pine woods, Transition Zone; Santa Lucia Mountains, California. Type locality: Los Pesares, Monterey County, California. May.

54. *Lupinus Suksdorfii* Robinson. Suksdorf's Lupine. Fig. 2613.

Lupinus Suksdorfii Robinson ex Piper, Contr. U.S. Nat. Herb. 11: 355. 1906.

Loosely appressed-pubescent and more or less villous, simple or somewhat branched, erect or ascending, 4–6 dm. tall. Leaves cauline, the lower long-petioled, scattered, petioles 4–11 cm. long, leaflets about 9, oblanceolate, acute, 30–60 by 6–12 mm.; peduncles 4–8 cm. long, racemes 15–20 cm. long; flowers subverticillate or scattered, 11–14 mm. long, bracts early deciduous, and much exceeding the buds, pedicels slender, 6–8 mm. long, spreading-pubescent; upper calyx-lip notched, lower entire; petals blue, banner suborbicular, glabrous, the yellow center turning brown, keel arcuate, ciliate on upper margins; pods 30–40 by 8–10 mm., appressed-silky, yellow, ovules 5–7, seeds about 6 by 5 mm., flattish, flesh-colored, mottled with darker.

Dry hillsides, Transition Zone; Klickitat County, Washington, and Hood River County, Oregon. Type locality: Columbia River, west Klickitat County, Washington. May–July.

55. *Lupinus Sabinii* Dougl. Sabin's Lupine. Fig. 2614.

Lupinus Sabinii Dougl. ex Hook. Fl. Bor. Amer. 1: 166. 1830.

Appressed-subsilky, branched above, erect, 6–12 dm. tall. Leaves cauline, the lower long-petioled, scattered, petioles stout, 5–25 cm. long, leaflets 8–11, oblanceolate, appressed-pubescent on both sides, 6–15 cm. long, 8–25 mm. wide; peduncles 4–8 cm. long, racemes 15–30 cm. long; flowers 15–18 mm. long, verticillate, bracts early deciduous, pedicels about 10 mm. long, spreading-pubescent; calyx appressed-silky, upper lip notched, lower entire or notched; petals bright yellow, or rarely pale purple, banner suborbicular, glabrous, keel arcuate, densely ciliate on the upper edges; pods about 40 by 12 mm., dull yellow, densely appressed-pubescent, ovules 5–7, seeds 6–7 by 5 mm., flattish, dull reddish brown, unmarked.

Dry hillsides, Arid Transition Zone; Blue Mountains of Washington and Oregon. Type locality: "Blue Mountains of Northwest America, and on the dividing ridge of the Rocky Mountains near the confines of perpetual snow." June–July.

56. *Lupinus excubitus* M. E. Jones. Interior Bush Lupine. Fig. 2615.

Lupinus excubitus M. E. Jones, Contr. West. Bot. No. 8: 26. 1898.

Densely silky-appressed-pubescent, 3–15 dm. tall, with persistent woody stems, more or less branched. Leaves all long-petioled, the lower internodes short, petioles 4–10 cm. long, leaflets 7–8, oblong-oblanceolate to spatulate, 2–4 cm. long, densely silky on both sides; peduncles 4–18 cm. long, racemes 10–25 cm. long; flowers verticillate, the verticils well separated below, 10–13 mm. long, bracts deciduous, pedicels 4–6 mm. long, appressed-pubescent; upper calyx-lip notched, lower entire; petals blue, more or less mixed with violet, banner with yellow center, often changing to rich violet, glabrous or more or less pubescent on the back, suborbicular, wings and keel broad, the latter arcuate, ciliate on the upper edges and sometimes on the free edges below near claws; pods 3–5 cm. long by 7–10 mm. broad, ovules 6–8, seeds 4 by 3 mm., flattish, pale, with yellowish brown lateral lines.

Washes and rocky slopes, Upper Sonoran Zones; desert ranges of southern California, Inyo and Kern Counties to San Diego County, rarely near the coast. Type locality: Lone Pine, Inyo County, California. April–July.

Lupinus excubitus var. *Hállii* (Abrams) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 532. 1925. (*Lupinus Hállii* Abrams, Bull. Torrey Club 37: 151. 1910; *Lupinus Paynei* Davidson, Bull. S. Calif. Acad. 17: 58. 1918.) Usually larger and coarser, especially the flowers which are 14–18 mm. long. Canyons and hillsides, Upper Sonoran Zone; Ventura and San Bernardino Counties to San Diego County, California. Type locality: Reche Canyon, San Bernardino County, California.

Lupinus excubitus var. *Johnstonii* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 532. 1925. Differing only in being a low, subalpine shrub, the persistent woody branches congested, seldom over 15 cm. long; racemes 6–12 cm. long; flowers 14–18 mm. long. Dry mountain tops and slopes, same range as variety *Hállii*. Type locality: Baldy Lookout, San Antonio Mountains, Los Angeles County, California.

Lupinus excubitus var. *austromontanus* (Heller) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 532. 1925. (*Lupinus austromontanus* Heller, Muhlenbergia 2: 69. 1905.) Stems short, mostly herbaceous, the long-petioled leaves crowded at the base, with 1–3 reduced upper leaves; peduncles, racemes, and flowers as in variety *Hállii*. Open fields or grassy slopes, Kern County to San Diego County, California. Type locality: Tehachapi, Kern County, California.

57. *Lupinus sericatus* Kell. St. Helena Lupine. Fig. 2616.

Lupinus sericatus Kell. Proc. Calif. Acad. 7: 92. 1877.

Densely appressed-silky, usually unbranched, decumbent, 15–30 cm. tall. Leaves long-petioled, rather scattered, petioles 6–15 cm. long, leaflets 6–7, spatulate, rounded or retuse, 3–4 cm. long, usually over 12 mm. wide; peduncles 8–12 cm. long, racemes 10–30 cm. long, flowers scattered or subverticillate, 14–16 mm. long, bracts early deciduous, pedicels appressed-pubescent, 4–5 mm. long; upper calyx-lip bidentate, lower entire or minutely tridentate; petals purplish blue, banner suborbicular, more or less pubescent on the back, wings broad, keel arcuate, ciliate on the upper margins and on the lower free edges near claws; ovules 5–7, seeds light brown, more or less mottled.

Dry mountain tops, Upper Sonoran Zone; Mayacamas or St. Helena Range, Lake and Sonoma Counties, California. Type locality: Lake County, California. May–June.

58. *Lupinus cervinus* Kell. Santa Lucia Lupine. Fig. 2617.

Lupinus cervinus Kell. Proc. Calif. Acad. 2: 229. 1863.

Lupinus latissimus Greene, Leaflets Bot. Obs. 2: 68. 1910.

Densely velvety-pubescent or subsilky, unbranched, subacaulescent, erect, 15–30 cm. tall. Leaves long-petioled, crowded near the base, petioles 10–20 cm. long, leaflets 5–8, appressed-silky on both sides, obovate to lance-obovate, obtuse or rounded at apex, 2–6 cm. long, by 10–30 mm. wide; peduncles 15–20 cm. long, racemes 12–20 cm. long, flowers 14–16 mm. long, subverticillate or scattered, bracts early deciduous, pedicels 3–5 mm. long, spreading-pubescent; upper calyx-lip bidentate, lower entire or tridentate; petals broad, banner suborbicular, sparsely pubescent on the back, keel curved, ciliate on the upper margins and on the lower free edges near claws; pods appressed-silky, about 30 by 8 mm., ovules 6–8, seeds about 4 by 2 mm., rhombic-oblong, with dark lateral line on each side and more or less mottled.

Dry pine lands, Transition Zone; Santa Lucia Mountains, Monterey County, California. Type locality: Santa Lucia Mountains, California. May–June.

59. *Lupinus Grayi* S. Wats. Gray's Lupine. Fig. 2618.

Lupinus Grayi S. Wats. Proc. Amer. Acad. 11: 126. 1876.

Densely short-villous, usually unbranched, 20–35 cm. tall. Leaves all long-petioled, scattered along the stem, petioles 6–12 cm. long, leaflets 5–9, oblanceolate, 25–35 mm. by 5–7 mm., hairy on both sides; peduncles 5–15 cm. long, racemes 10–15 cm. long, flowers 12–14 mm. long, subverticillate, bracts early deciduous, pedicels 2–4 mm. long, spreading-pubescent; upper calyx-lip bifid or bidentate, lower entire or tridentate; petals blue, broad, banner with a yellow center, suborbicular, glabrous or more or less pubescent on the back, keel not much curved, densely ciliate on the upper margins and often also on the lower free edges near claws; pods appressed-pubescent, 25–30 by 6–8 mm., dull yellow, ovules 4–6, seeds about 4 by 3 mm., obscurely mottled and with dark lateral line on each side.

Canyons and mountain valleys, Transition Zone; Plumas County to Fresno County, California. Type locality: Clark's Ranch, Mariposa County, California, May–July.

60. *Lupinus ludovicianus* Greene. San Luis Lupine. Fig. 2619.

Lupinus ludovicianus Greene, Bull. Calif. Acad. 1: 184. 1885.

Densely woolly-pubescent and villous, more or less woody at base, erect, stout, branched, 3–6 dm. tall. Leaves long-petioled, velvety-woolly on both sides, petioles 6–10 cm. long, leaflets 4–8, cuneate or spatulate, 15–30 mm. long; peduncles 8–15 cm. long, racemes 15–20 cm. long; flowers 10–12 mm. long, whorled, pedicels about 3 mm. long, stout, woolly; calyx not gibbous, upper lip deeply lobed or cleft, lower tridentate; petals purplish, banner glabrous, its center darkest, wings glabrous, keel somewhat curved, ciliate on upper edges of acumen and near claws; pods densely appressed-pubescent, 20–25 by 5–7 mm., ovules 5–7, seeds about 4 mm. long, grayish yellow, obscurely or heavily marked.

Dry soil, Upper Sonoran Zone; southern San Luis Obispo County, California. Type locality: mountains above San Luis Obispo, California. July.

61. *Lupinus longifolius* (S. Wats.) Abrams. Watson's Bush Lupine. Fig. 2620.

Lupinus Chamissonis var. *longifolius* S. Wats. Bot. Calif. 1: 117. 1876.

Lupinus longifolius Abrams, Fl. Los Ang. 209. 1904.

Lupinus mollisifolius Davidson, Bull. S. Calif. Acad. 17: 57. 1918.

Appressed-pubescent, greenish, yet subsilky, erect, stout, shrubby below, branched above, 8–15 dm. tall. Leaves mostly short-petioled, crowded, axillary shoots well developed, petioles 4–7



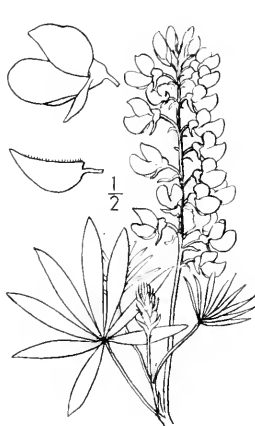
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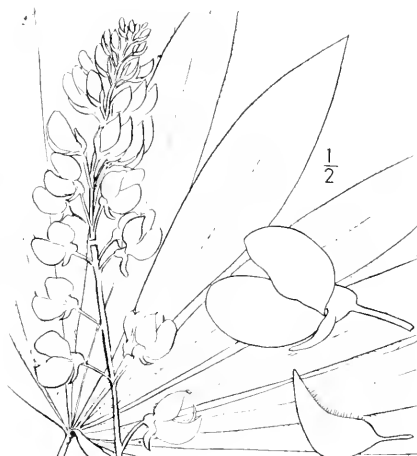
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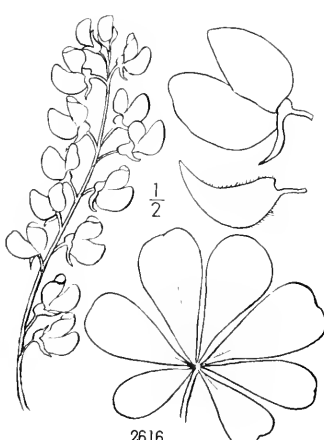
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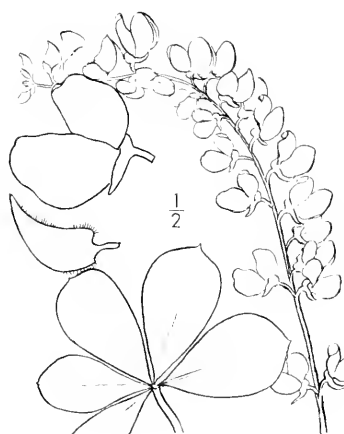
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2609. *Lupinus ornatus*
2610. *Lupinus alpicola*
2611. *Lupinus sericeus*

2612. *Lupinus Abramsii*
2613. *Lupinus Suksdorfii*
2614. *Lupinus Sabinii*

2615. *Lupinus excubitus*
2616. *Lupinus sericatus*
2617. *Lupinus cervinus*

cm. long or occasionally longer, leaflets 6-9, elliptic- or oblong-oblancoate, obtuse, 35-60 by 8-10 mm., equally subsilky on both sides; peduncles 6-12 cm. long, racemes 20-40 cm. long, flowers 14-18 mm. long, scattered or subverticillate, bracts deciduous, pedicels 5-10 mm. long, spreading-pubescent; calyx densely short-velvety, upper lip bidentate or cleft, lower entire or minutely bidentate; petals blue or bluish, rarely yellowish, banner glabrous, suborbicular, 14-18 mm. wide, keel more or less ciliate on the upper edges, somewhat curved; pods dull yellow, 40-60 by 9-10 mm., ovules 6-8, seeds about 6 by 4 mm., gray, with dark brown lateral lines and various mottlings.

Foothills and ocean bluffs, Upper Sonoran Zone; Los Angeles and San Bernardino Counties to San Diego County, California. Type locality: San Diego to Ojai, San Pascual, and San Antonio River. April-July.

62. *Lupinus arboreus* Sims. Tree Lupine. Yellow-flowered Bush Lupine.

Fig. 2621.

Lupinus arboreus Sims, Bot. Mag. 18: pl. 682. 1803.

Lupinus propinquus Greene, Erythraea 1: 126. 1893.

Appressed-pubescent to glabrate, rarely villous, branching shrub with a distinct trunk, but flowering the second or third year from seed, before showing the shrubby character, rarely persistently low and caespitose, 4-25 dm. tall. Leaves many, short-petioled, axillary shoots well developed, petioles 3-6 cm. long, leaflets 6-12, oblanceolate, appressed-pubescent on both sides or glabrate above, 30-60 by 5-10 mm.; peduncles 4-10 cm. long, racemes 10-30 cm. long, flowers 14-17 mm. long, scattered or subverticillate, bracts early deciduous, pedicels 6-10 mm. long, spreading-pubescent; upper calyx-lip notched or retuse, lower entire; petals broad, commonly bright yellow, but sometimes lilac, blue, violet, or mixed yellow and purple, banner suborbicular, glabrous, keel arcuate, ciliate along upper margins; pods dark brown, appressed-pubescent, 50-70 by 8-12 mm., ovules 8-12, seeds oblong, dark brown, unmarked or obscurely mottled, but with a pair of pale spots embracing the micropyle.

Sandy areas and canyons near the ocean, Humid Transition Zone; Santa Barbara County to Humboldt County, California, also at a few points along the coast of Washington and at Victoria, Vancouver Island, where said to be introduced. Type locality: not stated, but probably Monterey or San Francisco, California. March-June.

Lupinus arboreus var. *eximius* (Davy) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 531. 1925. (*Lupinus eximius* Davy, Erythraea 3: 116. 1895.) More or less villous, season's growth and internodes much shorter than in the species, hence leaves and flowers crowded; racemes only 5-10 cm. long; wings blue, banner largely yellow. Exposed mountain sides, Upper Sonoran Zone; near summit, Montara Mountain, San Mateo County, California. Type locality: highest ridge above Lake Pilarcitos, San Mateo County, California.

63. *Lupinus rivularis* Dougl. Riverbank Lupine. Fig. 2622.

Lupinus rivularis Dougl. ex Lindl. Bot. Reg. 19: pl. 1595. 1833.

Lupinus lignipes Heller, Muhlenbergia 8: 66. 1912.

Appressed-subsilky and more or less villous, green, stems simple or branched, ascending or erect, or sometimes decumbent, often fistulose, over 3 mm. thick, 4-9 dm. tall. Leaves short-petioled, not crowded, petioles 3-5 cm. long, rarely longer, leaflets 5-9, oblanceolate, acute or obtuse, sparsely appressed-pubescent beneath, becoming glabrous above, 30-40 by 5-10 mm.; peduncles 4-10 cm. long, racemes 6-20 cm. long; flowers 12-16 mm. long, verticillate or subverticillate, bracts early deciduous, pedicels 5-10 mm. long, spreading- or rarely appressed-pubescent; upper calyx-lip bidentate, lower entire; petals blue or variegated, banner glabrous, usually with the apical portion yellow, keel arcuate, ciliate on the upper edges; pods 40-50 by 7-10 mm., dull yellow and dark brown, subappressed-hairy, ovules 8-12, seeds 3-4 mm. long, mottled, usually with a prominent diagonal line on each side.

Sands or gravels, near streams or marshes, Transition Zone; mostly coastal, but reaching its maximum development in the Willamette Valley, Oregon, southern British Columbia to Mendocino County, California. Type locality: California. May-Aug.

64. *Lupinus variicolor* Steudel. Lindley Varied Lupine. Fig. 2623.

Lupinus versicolor Lindl. Bot. Reg. 23: pl. 1979. 1837. Not *Lupinus versicolor* Sweet.

Lupinus variicolor Steudel, Nom. ed. 2: 2: 78. 1841.

Lupinus franciscanus Greene, Pittonia 1: 64. 1887.

Lupinus Michenerii Greene, Erythraea 2: 119. 1894.

Appressed-subsilky and more or less villous, greenish, the stems usually branched, slender, decumbent or prostrate, 2-3 mm. thick, 2-8 dm. long. Leaves many, usually long-petioled, with axillary clusters well developed, petioles 4-10 cm. long, stipules and nodes equally hairy with the internodes, leaflets 7-9, oblanceolate, acute or obtuse, appressed-pubescent or glabrate above, 20-35 by 4-8 mm.; peduncles 4-12 cm. long, racemes 6-15 cm. long; flowers 11-16 mm. long, verticillate, bracts early deciduous, pedicels 4-12 mm. long, appressed- or spreading-pubescent; calyx greenish, upper lip entire or notched, lower entire; petals yellow, whitish, pinkish, bluish, or purple, the individual flower often variegated, the wings often darker than the glabrous banner, keel arcuate, ciliate on the upper edges; pods 30-40 by 7-10 mm., dark brown, loosely or appressed-hairy, ovules 7-9, seeds 3-4 mm. long, variously mottled.

Grassy fields and slopes near the coast, Humid Transition Zone; Humboldt County to Monterey, California. Type locality: California. May-July.

65. *Lupinus littoralis* Dougl. Seashore Lupine. Chinook Licorice. Fig. 2624.

Lupinus littoralis Dougl. ex Lindl. Bot. Reg. 14: pl. 1198. 1828.

Appressed-silky and more or less villous, especially at the nodes, stems decumbent, slender,

simple or branched, 1–5 dm. long, roots bright yellow. Leaves many, usually short-petioled, petioles mostly 3–4 cm. long, leaflets 5–9, oblanceolate, acute or obtuse, appressed-pubescent on both sides, 20–35 by 5–10 mm.; peduncles 4–12 cm. long, racemes 5–12 cm. long; flowers 10–13 mm. long, verticillate or nearly so, bracts early deciduous, pedicels 3–6 mm. long, spreading-pubescent; upper calyx-lip bidentate or entire, lower entire; petals blue, fading brownish, banner glabrous, suborbicular, keel arcuate, ciliate on the upper edges; pods slender, 30–35 by 5–6 mm., dark brown, appressed-pubescent, ovules 9–14, seeds linear-oblong, about 3 by 1.5 mm., mottled.

Coastal sands, Humid Transition Zone; northern California to Vancouver Island. Type locality: seashore, Cape Mendocino to Puget Sound. May–Aug.

66. *Lupinus Tidestromii* Greene. Tidestrom's Lupine. Fig. 2625.

Lupinus Tidestromii Greene, *Erythra* 3: 17. 1895.

Densely appressed-silky, unbranched, decumbent, stems slender, 1–3 dm. long, roots bright yellow. Leaves short-petioled, scattered, silvery-silky on both sides, petioles 1–3 cm. long, leaflets 3–5, often only 3, oblanceolate, acute or obtuse, about 20 by 5 mm.; peduncles 4–8 cm. long, racemes 2–10 cm. long, verticils 1–5; flowers 11–13 mm. long, bracts lance-ovate, 5 mm. long, early deciduous; pedicels slender, 3–5 mm. long, spreading-pubescent; upper calyx-lip deeply lobed, lower entire or notched; petals blue, banner glabrous, suborbicular, the white or yellow center changing to violet, keel arcuate, ciliate at the upper edges; pods 20–25 by 5 mm., succulent and terete when green, flat and yellow when dry, ovules 5–8, seeds rhombic, about 3 by 2.5 mm., dotted or marbled with black.

Sand dunes, Humid Transition Zone; Pacific Grove, Monterey County, and Point Reyes, Marin County, California. Type locality: Pacific Grove, California. May–June.

67. *Lupinus Covillei* Greene. Coville's Lupine. Fig. 2626.

Lupinus Covillei Greene, *Proc. Acad. Phila.* 1892: 365. 1893.

Lupinus dasyphyllus Greene, *Leaflets Bot. Obs.* 1: 73. 1904.

Loosely villous with spreading hairs, usually unbranched, erect, fistulous, 3–9 dm. tall. Leaves all cauline, short-petioled, scattered below, more crowded below the inflorescence, petioles 1–6 cm. long, leaflets about 7, nearly linear, attenuate both ways, acute, villous on both sides, 3–6 cm. long, 4–8 mm. wide; peduncles 2–6 cm. long, racemes 10–20 cm. long, flowers 10–14 mm. long, scattered or subverticillate, rather crowded, bracts persistent, linear, villous, 8–15 mm. long, pedicels 2–3 mm. long, spreading-villous; calyx long-bracteolate, villous, upper lip bidentate, lower entire or tridentate; petals blue, banner glabrous, suborbicular, keel arcuate, sparsely ciliate on upper edges near apex; pods 25–30 by 6–8 mm., villous, ovules 4–6, seeds not seen.

Canadian and Hudsonian Zones; High Sierra Nevada, Yosemite region to Tulare County, California. Type locality: Farewell Gap, Tulare County, California. July–Aug.

68. *Lupinus gracilentus* Greene. Greene's Slender Lupine. Fig. 2627.

Lupinus gracilentus Greene, *Proc. Acad. Phila.* 1892: 365. 1893.

Sparsely appressed-pubescent to glabrate, 4–8 dm. tall; stems slender, suberect. Leaves cauline, lower long-petioled, upper crowded in axillary clusters, subsericeous beneath, glabrous or glabrate above; stipules 10–15 mm. long, filiform, more or less half adnate; petioles 5–14 cm. long, very slender, lowest and longest about 3 times as long as leaflets; leaflets 5–8, linear, 40–80 by 2–5 mm., acuminate at apex; peduncles 6–12 cm. long, slender; racemes 10–20 cm. long; flowers 10–13 mm. long, spreading to ascending in distinct verticils; pedicels 2–4 mm. long, loosely ascending-pubescent; floral bracts caducous, filiform, 8–10 mm. long; calyx subsymmetrical or slightly subgibbous, upper lip bidentate, lower bidentate or entire, linear; petals blue or bluish, banner and wings glabrous, the latter covering most of keel, keel ciliate above near middle; ovules 7–8, pods and seeds not seen.

Canadian Zone; upper end of Tuolumne Canyon, above and below Tuolumne Falls, Yosemite Park, Tuolumne County, California. July–Aug.

69. *Lupinus albicaulis* Dougl. Sickie-keeled Lupine. Fig. 2628.

Lupinus albicaulis Dougl. ex Hook. *Fl. Bor. Amer.* 1: 165. 1833.

Lupinus falcifer Nutt. ex Torr. & Gray, *Fl. N. Amer.* 1: 378, as a synonym. 1840.

Thinly appressed-pubescent, rather stout, branched above, 5–9 dm. tall. Leaves cauline, all short-petioled, petioles 2–4 cm. long, leaflets 5–9, oblanceolate, acute, thinly appressed-hairy on both sides; peduncles 3–8 cm. long, racemes 10–30 cm. long; flowers 12–16 mm. long, not crowded, pedicels 4–6 mm. long, spreading-pubescent; calyx-lips notched or the lower entire; petals whitish to purple, fading brown, banner lance-ovate, acute at apex, wings very narrow, covering little of the slender, much-curved keel which is non-ciliate; pods appressed-pubescent, 30–40 by 8–10 mm., ovules about 6, seeds compressed, mottled with gray, about 4 mm. long.

Open situations, Transition Zone; western Washington to Nevada County, California. Type locality: about Fort Vancouver, on the Columbia. May–Aug.

Lupinus albicaulis var. *shastensis* (Heller) C. P. Smith in Jepson, *Man. Fl. Pl. Calif.* 528. 1925. (*Lupinus shastensis* Heller, *Muhlenbergia* 2: 67. 1905.) More slender and sometimes less branched, the flowers only 8–11 mm. long. Transition Zone; Siskiyou County, California, and adjacent Oregon, occasional southward in the Sierra Nevada as far as Kern County. Type locality: Shasta Springs, Siskiyou County, California.

70. *Lupinus crœceus* Eastw. Mount Eddy Lupine. Fig. 2629.

Lupinus croceus Eastw. *Leaflets West. Bot.* 2: 126. 1938.

Plant 4–6 dm. tall, perennial, herbaceous, erect, branched at base, stems slender, nerved,

appressed-subsericeous or glabrate. Leaves numerous, cauline, glabrate or subsericeous both sides, stipules 6–8 mm. long, subadnate or mostly free, petioles mostly 3–8 cm. long, slender, almost equaling their leaflets, leaflets 5–8, obtuse or acute, mostly oblanceolate, mucronulate, flat, radiating, largest 40–60 mm. long, 5–18 mm. wide; peduncles 4–6 cm. long, racemes 6–10 cm. long, verticils, if definite, 4–6, approximate or well separated, floral bracts 3–4 mm. long, linear, deciduous, almost equaling their buds, pedicels 3–5 mm. long, ascending, subappressed-pubescent; flowers 12–15 mm. long, spreading, often subverticillate, calyx subsymmetrical, appressed-silky, upper lip bidentate, lower entire; petals pale or bright yellow, banner glabrous, suborbicular, reflexed 3–5 mm., wings 5–6 mm. long, covering keel, keel non-ciliate, arcuate; pods 20–35 mm. long, 9–10 mm. wide, ascending or suberect, dull dark yellow, ovules 4–5, seeds 6–7 by 4–6 mm., dull clay-colored, minutely dotted with darker.

Local on mountain sides, Siskiyou and Trinity Counties. Lower Transition Zone; Salmon, Scott, and Trinity mountains, and the north side of Mount Shasta, the type locality. May–July.

Lupinus pilosellus Eastw. Leaflets West. Bot. 2: 127. 1938. Apparently differing from the last in having noticeable spreading pubescence. Type locality: Trinity River valley, north of Carrville, between Eagle and Bear Creeks.

71. *Lupinus Andersønia* S. Wats. Anderson's Lupine. Fig. 2630.

Lupinus Andersonii S. Wats. Bot. King Expl. 58. 1871.

Minutely appressed-pubescent, slender, branched above, the branches usually floriferous, 3–9 dm. tall. Leaves numerous, short-petioled, all cauline, petioles 2–5 cm. long, leaflets about 7, oblanceolate, acute or obtuse, 25–50 by 5–10 mm., greenish above; peduncles 3–6 cm. long, racemes 6–18 cm. long, mostly lax; flowers 10–12 mm. long, scattered or subverticillate, bracts deciduous, pedicels about 5 mm. long, spreading-pubescent; calyx-lips entire or the upper 2-toothed; petals blue, purplish, or yellowish, banner glabrous, wings covering most of the arcuate, non-ciliate keel; pods appressed-pubescent, 3–4 cm. by about 8 mm., ovules 4–6, seeds compressed, 4–5 mm. long, more or less obscurely mottled on a yellowish or brown ground-color.

Exposed plains and slopes, Arid Transition Zone; southern Oregon to Humboldt and Tulare Counties, California, also in the San Bernardino Mountains and western Nevada. Type locality: near Carson City, Nevada. June–Sept.

Lupinus Andersonii var. *apertus* (Heller) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 528. 1925. (*Lupinus apertus* Heller, Muhlenbergia 8: 103. 1912.) Stems 2–4 dm. tall, usually unbranched or with sterile foliaceous branchlets, foliage greener; banner more or less pubescent on the back near apex. Open woods, Upper Transition Zone; Placer and Nevada Counties, California, near Donner Lake. Type locality: Summit, Placer County, California.

72. *Lupinus fulcratus* Greene. California Green-stipuled Lupine. Fig. 2631.

Lupinus fulcratus Greene, Pittonia 3: 159. 1897.

Lupinus fraxinetorum Greene, Leaflets Bot. Obs. 2: 234. 1912.

Very much like the last, branched or unbranched, 3–8 dm. tall. Stipules green and leaf-like, lanceolate, oblanceolate, elliptic, or oval (linear-lanceolate and inconspicuous in all related forms).

Transition Zone; Sierra Nevada forests, Eldorado County to Fresno County, California. Type locality: Fresno County, California, at considerable elevations in the mountains. July–Sept.

73. *Lupinus elatus* Johnston. Johnston's Silky Lupine. Fig. 2632.

Lupinus elatus Johnston, Bull. S. Calif. Acad. 17: 63. 1918.

Also very much like *L. Andersonii*; erect, branched above, 5–9 dm. tall. Leaflets silvery-silky above, duller below; flowers 10–14 mm. long, banner glabrous or pubescent near middle of back.

Under pines, Upper Transition Zone; San Antonio and San Bernardino Mountains, southern California. Type locality: head of Icehouse Canyon, San Bernardino County, California. June–Aug.

74. *Lupinus adsurgens* Drew. Drew's Silky Lupine. Fig. 2633.

Lupinus adsurgens Drew, Bull. Torrey Club 16: 150. 1889.

Lupinus Gormanii Piper, Smiths. Misc. Coll. 50: 200. 1907.

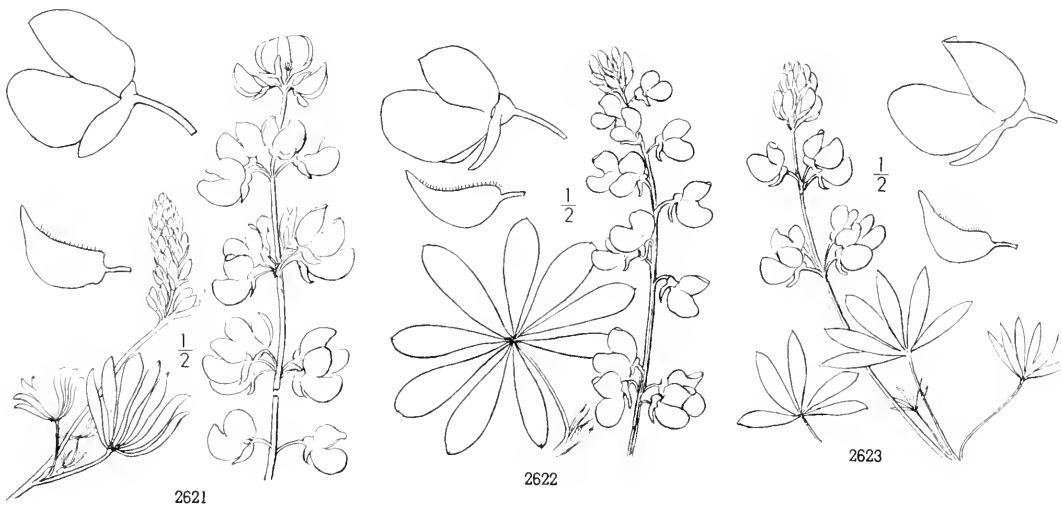
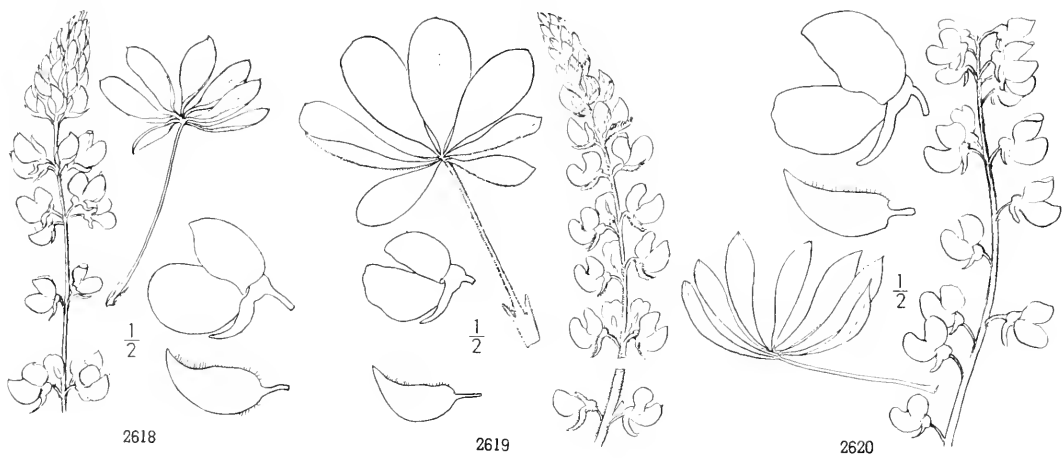
Lupinus Pendletonii Heller, Muhlenbergia 2: 295. 1907.

Appressed- or subappressed-silky-pubescent, slender, erect or ascending, 2–6 dm. tall. Leaves several, all short-petioled, petioles 15–40 mm. long, leaflets 5–8, oblanceolate, obtuse or rounded at apex, 20–35 by 5–8 mm.; peduncles 2–6 cm. long, racemes 4–10 cm. long, not dense; flowers 9–12 mm. long, scattered or subverticillate, bracts early deciduous, pedicels 2–4 mm. long, slender, spreading-pubescent; calyx silky, upper lip notched or entire, lower entire; petals pale yellow, lilac or blue, keel non-ciliate, usually curved; ovules 4–6, pods and seeds not seen.

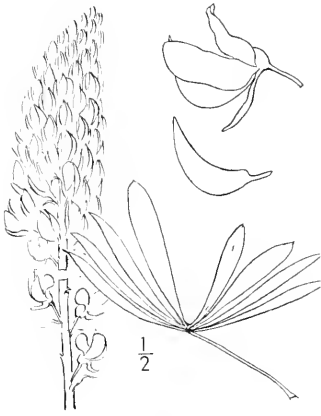
Higher mountain sides, Upper Transition and Hudsonian Zones; central Cascade Mountains of Oregon to San Diego County, California. Type locality: western side of South Fork Mountain, Humboldt County, California. April–July.

Lupinus adsurgens var. *lilacinus* Heller ex C. P. Smith in Jepson, Man. Fl. Pl. Calif. 529. 1925. Decumbent, hardly silky, the pubescence more spreading; pedicels stouter, 4–6 mm. long, flowers 12–14 mm. long; wings much exceeding keel. Arid Transition Zone; Lake, Glenn, and San Diego Counties, California. Type locality: Newville-Covelo road, Glenn County, California.

Lupinus adsurgens var. *undulatus* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 529. 1925. Differing from variety *lilacinus* in leaflets larger and more greenish, wing-petals smaller scarcely exceeding keel, and banner with undulate margins. Open woods, Transition Zone; Yosemite region to Tuolumne Grove, Sierra Nevada, California. Type locality: Yosemite-Crocker's, Mariposa County, California.



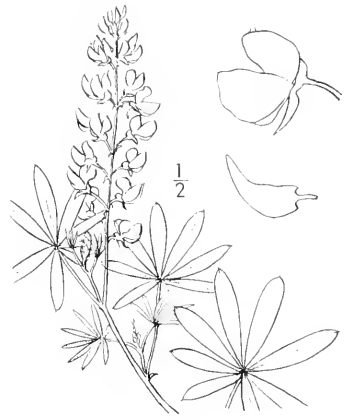
2618. *Lupinus Grayi*
2619. *Lupinus ludovicianus*
2620. *Lupinus longifolius*
2621. *Lupinus arboreus*
2622. *Lupinus rivularis*
2623. *Lupinus variicolor*
2624. *Lupinus littoralis*
2625. *Lupinus Tidestromii*
2626. *Lupinus Covillei*



2628



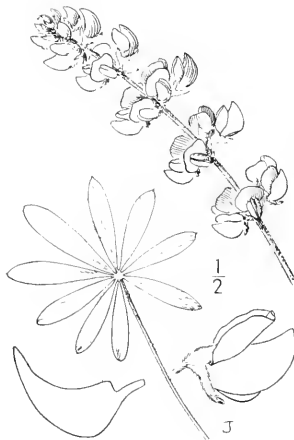
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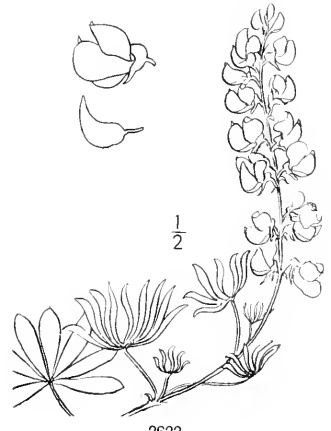
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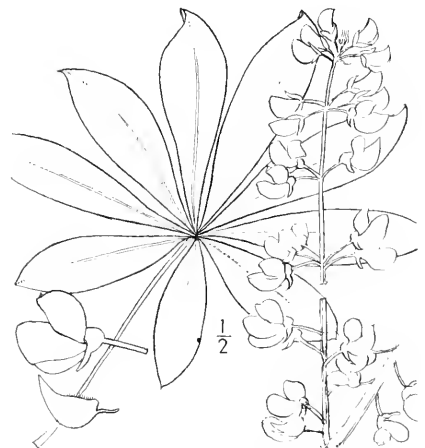
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2627. *Lupinus gracilentus*
2628. *Lupinus albicaulis*
2629. *Lupinus croceus*

2630. *Lupinus Andersonii*
2631. *Lupinus fulcratus*
2632. *Lupinus elatus*

2633. *Lupinus adsurgens*
2634. *Lupinus formosus*
2635. *Lupinus latifolius*

75. *Lupinus formosus* Greene. Summer or Late Lupine. Fig. 2634.

Lupinus formosus Greene, Fl. Fran. 42. 1891.

Lupinus proximus Heller, Muhlenbergia 2: 67. 1905.

Appressed-silky, decumbent to erect, 3–9 dm. tall, stems 2–4 mm. thick. Leaves cauline, short-petioled, petioles 3–7 cm. long, leaflets 7–9, silky on both sides, oblanceolate, 3–7 cm. by 3–15 mm.; peduncles 1–4 cm. long, racemes 10–25 cm. long; flowers 12–14 mm. long, usually whorled, bracts early deciduous, pedicels 3–4 mm. long, spreading-pubescent; calyx silky, upper lip toothed or notched, lower entire or rarely notched; petals violet, lilac, blue or white, banner mostly suborbicular, glabrous, 11–14 mm. wide, wings covering keel which is non-ciliate, arcuate; pods silky-hairy, 30–35 by about 8 mm., ovules 5–7, seeds 3–4 mm. long, mottled with grayish.

Open fields and woods, valleys and hillsides, Upper Sonoran and Transition Zones; Butte County, California, to Lower California. Type locality: Mare Island, Solano County, California. April–Oct. Exceedingly variable southward.

Lupinus formosus var. *Bridgesii* (S. Wats.) Greene, Fl. Fran. 42. 1891 (*Lupinus albicaulis* var. *Bridgesii* S. Wats. Proc. Amer. Acad. 8: 527. 1873; *Lupinus Bridgesii* Heller, Muhlenbergia 1: 112. 1905; *Lupinus Greenei* Heller, Muhlenbergia 6: 72. 1910.) Differing only in having few to many widely spreading hairs; stems slender, 2–4 mm. thick. Siskiyou County to San Diego County, California. Type locality: near San Francisco, California. As the species, abundant and variable.

Lupinus formosus var. *robustus* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 529. 1925. More or less spreading-pubescent, stouter, stems 6–7 mm. thick; flowers 16–18 mm. long, lower calyx-lip 12–14 mm. long, banner oblong, 15–18 mm. long. Valley fields, Lower Sonoran Zone; Colusa County to Fresno County, California. Type locality: College City, Colusa County, California.

Lupinus formosus var. *Clémensae* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 529. 1925. More or less villous, simple or with sterile foliaceous branchlets, 2–4 dm. tall; leaves loosely pubescent above, petioles only 15–20 mm. long; flowers 10–14 mm. long, banner often pubescent on the back. Hillsides, Arid Transition Zone; Jackson County, Oregon, to San Diego County, California. Type locality: Greenville, Plumas County, California.

Lupinus formosus var. *hyacinthinus* (Greene) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 529. 1925. (*Lupinus hyacinthinus* Greene, Leaflets Bot. Obs. 2: 85. 1910.) Pubescence thinner and leaves decidedly greenish, hardly silky, 6–12 dm. tall; lower calyx-lip about 10 mm. long; banner 14–18 mm. wide, blue or purplish, with yellow center. Transition Zone; San Gabriel and San Jacinto Mountains, southern California. Type locality: San Jacinto Mountains, California.

76. *Lupinus latifolius* Agardh. Broad-leaved Lupine. Fig. 2635.

Lupinus latifolius Agardh, Syn. Gen. Lup. 18. 1835.

Lupinus cytisoides Agardh, loc. cit.

Glabrate or minutely appressed-pubescent, rarely with some spreading hairs, commonly branched above, 6–12 dm. tall. Largest leaves near middle of stem and long-petioled lower leaves usually withered by flowering time; petioles about equaling their leaflets which are 5–8, broadly oblanceolate, usually acute, but sometimes obtuse, 4–10 cm. by 10–30 mm.; peduncles 8–20 cm. long; racemes rather laxly flowered, 15–45 cm. long; flowers verticillate or scattered, 10–14 mm. long; bracts early deciduous; pedicels 6–12 mm. long, spreading-pubescent; upper calyx-lip notched, lower entire; petals blue or purple, rarely yellowish, fading brown, banner suborbicular, glabrous, 9–10 mm. wide, wings truncate or incurved on lower free edge, the keel somewhat exposed, arcuate, with slender acumen, ciliate on upper margins from middle to near claws; pods dark brown, about 30 by 6–8 mm., ovules 7–10, seeds about 4 mm. long, mottled with dark brown.

Open woods and thickets, canyons or hillsides, Upper Sonoran and Transition Zones; Coast Ranges of California, San Diego County to Humboldt County, in the Sierra Nevada, and on Mount Constitution, Orcas Island, Washington. Type locality: "California," collected by Douglas, probably near Monterey. April–June.

Lupinus latifolius var. *Dudleyi* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 530. 1925. Densely villous with long spreading hairs, stems decumbent at base; flowers 14–16 mm. long. Known only from the type collection taken by Wm. R. Dudley. Type locality: Montara Mountains, San Mateo County, California.

Lupinus latifolius var. *columbianus* (Heller) C. P. Smith, Bull. Torrey Club 51: 307. 1924. (*Lupinus confusus* Heller, Muhlenbergia 8: 63. 1912, not *L. confusus* Rose. 1905; *Lupinus columbianus* Heller, op. cit. 8: 84. 1912; *Lupinus agninus* Gandoger, Bull. Soc. Bot. Fr. 4: 13: 461. 1913.) Differs from the typical phases of the species in the wing-petals being broader, out-curved on the lower free edges, thus covering all or most of the keel; 4–24 dm. tall, according to ecological conditions; flowers 10–14 mm. long. Dry or moist slopes and along streams, Transition and Hudsonian Zones; Coast Ranges and Cascade Mountains of Washington and Oregon, east at least to Heppner, Morrow County, and Ochoco Forest, Crook County, Oregon, also in the Sierra Nevada of California. Type locality: Hood River, Oregon.

Lupinus latifolius var. *Parishii* C. P. Smith in Jepson, Man. Fl. Pl. Calif. 530. 1925. Stout and tall, 9–20 dm., commonly fistulose; racemes often dense; flowers 14–18 mm. long; keel densely long-ciliate; seeds 6–7 mm. long, often pale and obscurely marked. Canyons, Arid Transition Zone; Butte County to San Diego County, reaching the coast in southern California only. Type locality: near Farris Hill, San Bernardino Valley, California.

Lupinus latifolius var. *longipes* (Greene) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 530. 1924. (*Lupinus longipes* Greene, Fl. Fran. 41. 1891.) Stoutish, striate, hardly fistulose; leaves mostly basal, persistent at flowering time, with petioles 3–5 dm. long, racemes not dense; flowers 12–14 mm. long; keel ciliate; seeds with a dark diagonal line on each side. Moist soil, not common, Fresno County, California, to Siskiyou Mountains, southern Oregon. Type locality: "along streams at middle or higher elevations in the Sierra, northward to Oregon."

Lupinus latifolius var. *ligulatus* (Greene) C. P. Smith, Contr. Dudley Herb. 1: 49. 1927. (*Lupinus ligulatus* Greene, Pittonia 1: 215. 1888; *Lupinus ligulatus barbatus* Henderson, Bull. Torrey Club 27: 345. 1900; *Lupinus barbatus* Heller, Muhlenbergia 8: 61. 1912.) Stems simple or branched, often stout and fistulose, glabrate or sparsely villous; leaves often sparsely subvillous below, stipules and bracts of axil racemes villous; pedicels 2–4 mm. long, glabrate. Moist soil, Upper Sonoran and Arid Transition Zones; Douglas, Klamath, and Lake Counties, Oregon, and Modoc County, California. Type locality: Crooked Creek, Klamath County, Oregon.

Lupinus latifolius var. *viridifolius* (Heller) C. P. Smith, Contr. Dudley Herb. 1: 50. 1927. (*Lupinus viridifolius* Heller, Muhlenbergia 2: 64. 1905.) Much branched above, slender or more or less fistulose below, glabrate or sparsely appressed-hairy; leaves sparsely appressed-pubescent below, stipules short and inconspicuous; bracts short-villous, but not exceeding buds; pedicels 2–4 mm. long, appressed-pubescent. Open woods, Josephine County, Oregon, to Shasta County, California. Type locality: Dunsmuir, Siskiyou County, California.

77. *Lupinus Búrkei* S. Wats. Burke's Lupine. Fig. 2636.

Lupinus Burkei S. Wats. Proc. Amer. Acad. 8: 525. 1873.

Lupinus apodotropis Heller, Muhlenbergia 7: 14. 1911.

Glabrate except in the inflorescence, usually succulent and fistulous, but slender when on hillsides in dry seasons, erect, 3–8 dm. tall. Lower leaves long-petioled, all glabrous above, glabrate beneath, petioles 8–20 cm. long, leaflets 5–10, oblanceolate, acute, bright green above, paler beneath, 4–9 cm. long by 8–20 mm. wide; peduncles 5–10 cm. long, racemes 8–16 cm. long, many-flowered; flowers 10–13 mm. long, scarcely verticillate, pedicels 2–5 mm. long, spreading-pubescent, bracts subsistent, villous; calyx loosely pubescent, upper lip entire or notched, lower entire; petals blue, banner with yellow center turning violet, glabrous, keel arcuate, slender, non-ciliate; pods pubescent, 25–35 by 5–6 mm., ovules 5–8, seeds 3–4 by 2–3 mm., dull yellow marbled with brown.

Moist meadows and hillsides, Arid Transition Zone; eastern Washington and eastern Oregon to the Yellowstone National Park region. Type locality: Snake country (Burke). June–Aug.

78. *Lupinus supérbus* Heller. Superb Lupine. Fig. 2637.

Lupinus superbis Heller, Muhlenbergia 2: 209. 1906.

Glabrate below, stout, fistulous, erect, 8–10 dm. tall. Leaves glabrous above, villous beneath, lower petioles about 10 cm. long, upper shorter, leaflets 5–9, oblanceolate, acute, about 5 cm. by 10 mm.; peduncles 3–8 cm. long, racemes 12–20 cm. long, densely flowered; flowers 10–12 mm. long, subverticillate, pedicels slender, 3–4 mm. long, appressed-pubescent, bracts early deciduous, villous; calyx silky, both lips entire; petals violet-purple, banner glabrous, keel arcuate, non-ciliate; pods villous, ovules 7–8, seeds whitish, unmarked.

Meadows, Upper Sonoran Zone; Bishop, Inyo County, California, the type locality. May–June.

Lupinus superbis var. *elongátus* (Greene) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 528. 1925. (*Lupinus elongatus* Greene ex Heller, Muhlenbergia 6: 17. 1910.) Flowers 12–15 mm. long, scattered or in lax verticils; leaves appressed-hairy beneath. Wet soil near streams, Upper Transition Zone; Sierra Nevada, Tulare County to Modoc County, California, and adjacent Nevada. Type locality: Spooner, Douglas County, Nevada.

Lupinus superbis var. *bernardinus* Abrams ex C. P. Smith in Jepson, Man. Fl. Pl. Calif. 528. 1925. (*L. bernardinus* Abrams ex Eastw. Leaflets West. Bot. 2: 182. 1939.) Like the last, but flowers only 9–11 mm. long, usually scattered in lax racemes. Similar habitats, Upper Transition Zone; San Bernardino Mountains to Butte County, California, and near Sumpter, Baker County, Oregon. Type locality: Deep Creek, San Bernardino County, California.

79. *Lupinus polyphýllus* Lindl. Large-leaved Lupine. Fig. 2638.

Lupinus polyphyllus Lindl. Bot. Reg. 13: pl. 1096. 1827.

Minutely appressed- or spreading-pubescent, erect, mostly unbranched, 5–15 dm. tall, stout and fistulous. Leaves few, mostly long-petioled, glabrous or minutely pubescent above, petioles 15–30 cm. long, stout, leaflets 10–17, oblanceolate, 7–15 cm. long, 15–30 mm. wide; peduncles 3–8 cm. long, racemes 15–60 cm. long; flowers 12–14 mm. long, usually not crowded, subverticillate, bracts early deciduous, pedicels 10–16 mm. long, usually appressed-pubescent; calyx-lips entire, upper broadly ovate, lower acuminate; petals blue, purple, reddish, or yellowish, glabrous, keel falcate, non-ciliate; pods dark brown, loosely hairy, 25–40 mm. long by 7–9 mm. wide, ovules 5–9, seeds about 4 mm. long, variously colored and spotted.

Moist soil, Lower Transition Zone; Lake and Siskiyou Counties, California, northward to British Columbia. Type locality: in the northwest of North America. May–Aug.

Lupinus polyphyllus var. *grandifólius* (Lindl.) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 528. 1925. (*Lupinus grandifolius* Lindl. ex Agardh, Syn. Gen. Lup. 18. 1835; *Lupinus macrophyllus* Benth. in Sweet, Brit. Flow. Gard. II, 4: pl. 356. 1838; *Lupinus magnus* Greene, Pittonia 3: 160. 1897.) Racemes compact; pedicels stout, 6–9 mm. long, densely spreading-pubescent; stems sometimes villous. Wet soil, Humid Transition Zone; near the coast from near Santa Cruz to Sonoma County, California. Type locality: California.

Lupinus polyphyllus var. *pallidipes* (Heller) C. P. Smith, Contr. Dudley Herb. 1: 47. 1927. (*Lupinus pallidipes* Heller, Muhlenbergia 7: 91. 1911.) Leaves persistently pubescent on the upper surface; color of petals as variable as in the typical form. Upper Sonoran and Transition Zones; Vancouver Island to northern California. Type locality: Eugene, Lane County, Oregon.

80. *Lupinus mínimus* Dougl. Kettle Falls Lupine. Fig. 2639.

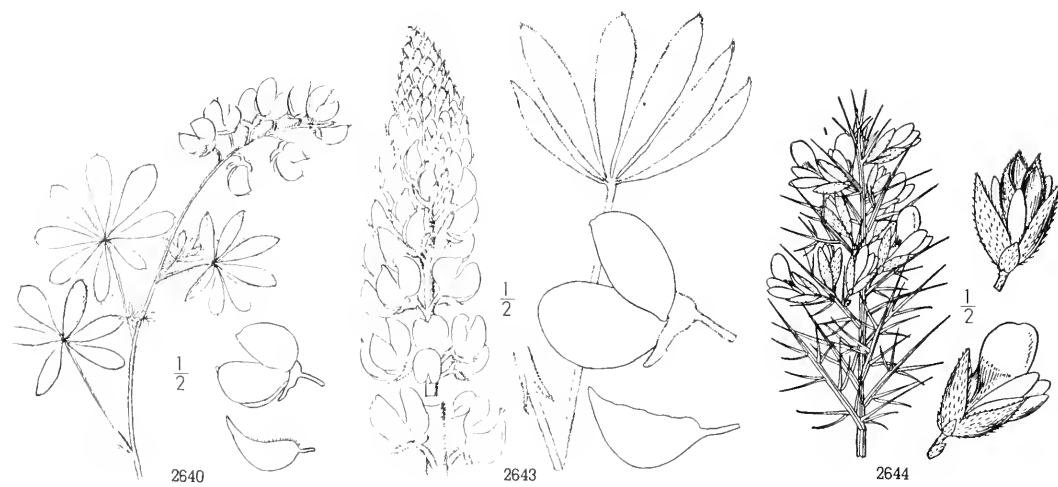
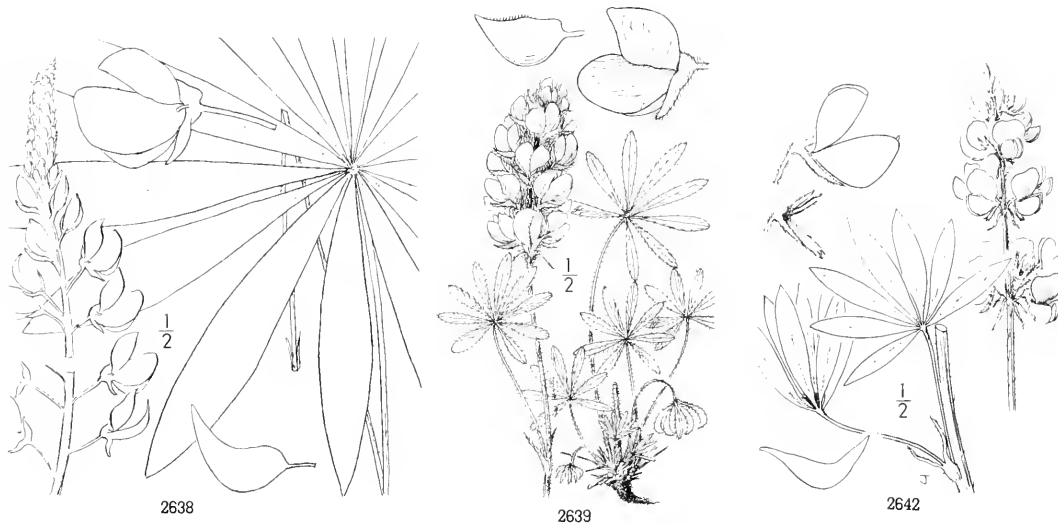
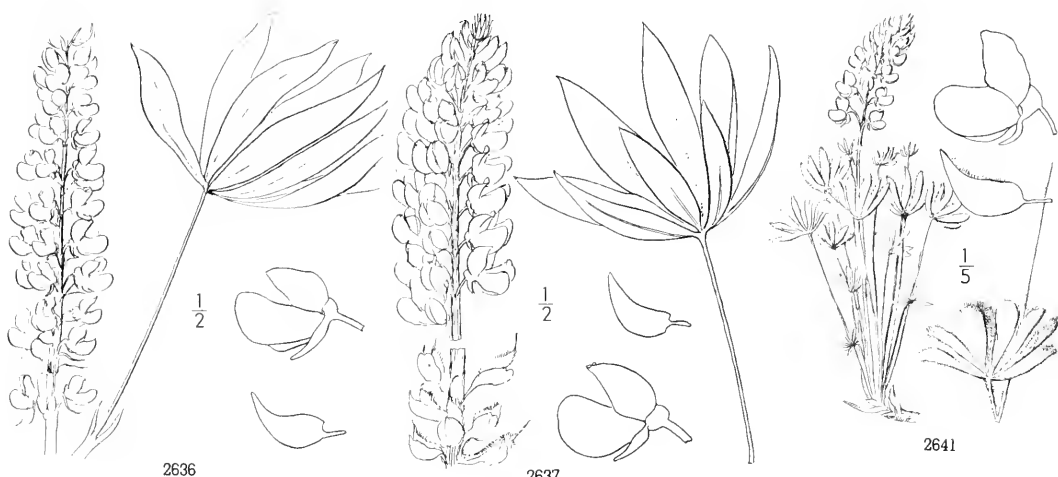
Lupinus minimus Dougl. ex Hook. Fl. Bor. Amer. 1: 163. 1830.

Lupinus Piperii Robinson, Contr. U.S. Nat. Herb. 11: 353. 1906.

Stems few, short, subappressed-silky, with one or two reduced leaves, unbranched, erect to decumbent, 15–30 cm. tall. Leaves mainly basal, long-petioled, the petioles 5–10 cm. long, leaflets 5–9, oblanceolate, 2–3 cm. long, silky on both sides; peduncles 7–13 cm. long, usually surpassing the foliage, about equaling the racemes; flowers 8–14 mm. long, loosely subverticillate, spreading, bracts deciduous, pedicels 2–4 mm. long, spreading-pubescent; upper calyx-lip bifid, lower entire; petals deep blue, the banner paler at the center, suborbicular, glabrous, keel somewhat curved, ciliate on the upper edges; pods 20–25 mm. long, ovules 4 or 5.

Alluvial gravels, Arid Transition Zone; eastern Washington to central Montana and Wyoming. Type locality: mountain valleys in northwest America, near the Kettle Falls, and very abundant toward the Rocky Mountains, along the courses of the Columbia. May–July.

Lupinus minimus var. *Héllerae* (Heller) C. P. Smith & St. John, Fl. S.E. Wash. 228. 1937. (*Lupinus Héllerae* Heller, Bull. Torrey Club 25: 265. 1898.) Differing only in having the pedicels appressed-pubescent. Sands and gravels of the Clearwater River, near Lewiston, Idaho, and collected once at Bishop, Snake River, Whitman County, Washington. Type locality: Lewiston, Nez Perce County, Idaho.



2636. *Lupinus Burkei*
2637. *Lupinus superbus*
2638. *Lupinus polyphyllus*

2639. *Lupinus minimus*
2640. *Lupinus volcanicus*
2641. *Lupinus saxosus*

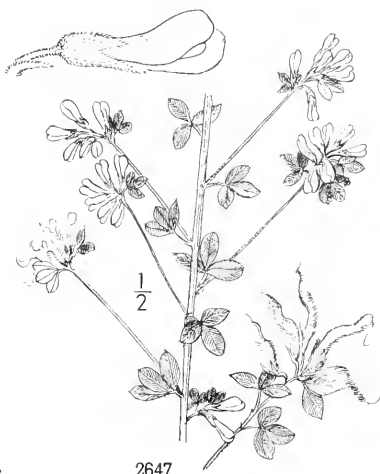
2642. *Lupinus arcticus*
2643. *Lupinus magnificus*
2644. *Ulex europaeus*



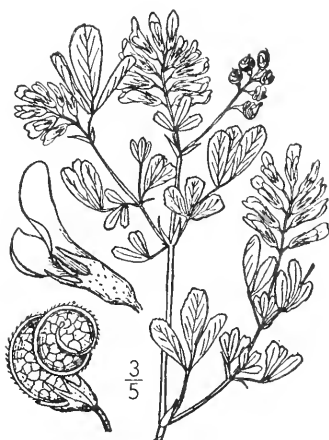
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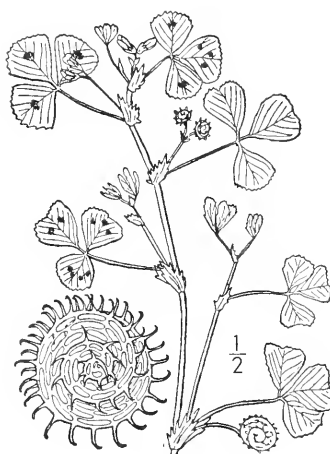
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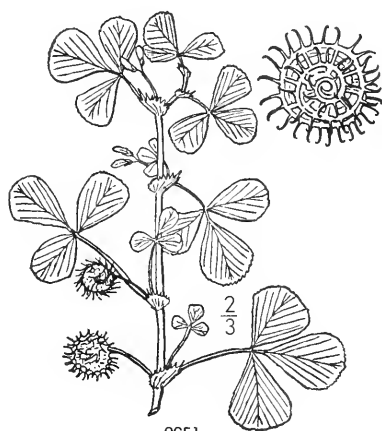
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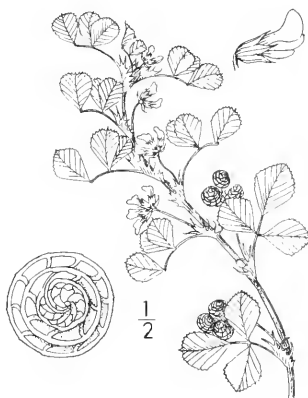
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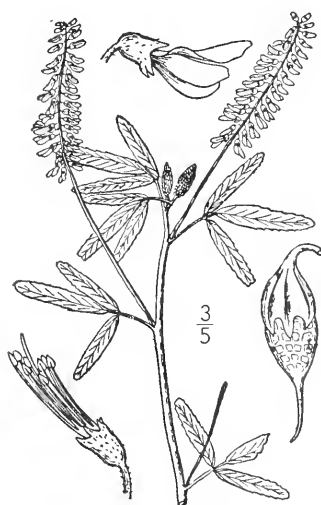
2650



2651



2652



2653

2645. *Cytisus multiflorus*2646. *Cytisus scoparius*2647. *Cytisus monspessulanus*2648. *Medicago sativa*2649. *Medicago lupulina*2650. *Medicago arabica*2651. *Medicago hispida*2652. *Medicago apiculata*2653. *Melilotus alba*

81. *Lupinus volcánicus* Greene. Mount Rainier Lupine. Fig. 2640.

Lupinus volcánicus Greene, Pittonia 3: 308. 1898.

Loosely spreading-villous, stems simple, slender, scaly at base, 2-3 dm. tall. Leaves few, cauline, lowest longer-petioled, bright green though loosely villous on both sides, petioles slender, 2-4 cm. long, leaflets 6-8, oblanceolate to spatulate, obtuse or rounded at apex, 2-3 cm. long; peduncles 3-4 cm. long, racemes 3-6 cm. long; flowers 10-12 mm. long, subverticillate, pedicels 3-5 mm. long, spreading-pubescent, bracts early deciduous; calyx villous, upper lip notched, toothed, or lobed, lower entire; petals blue, banner with a yellow center which changes to purple, glabrous, broader than long, keel arcuate, ciliate from on upper edges; ovules 5, pods and seeds not seen.

Volcanic sand, Arctic Zone; Mount Rainier, Washington, the type locality and not known elsewhere. Aug.

82. *Lupinus saxosus* Howell. Stony-ground Lupine. Fig. 2641.

Lupinus saxosus Howell, Erythraea 1: 110. 1893.

Densely villous, low, stems abbreviated, whole plant 1-3 dm. tall. Leaves mostly basal and long-petioled, glabrous or subvillous above, appressed-silky below; petioles 5-8 cm. long, leaflets 8-12, oblanceolate, 12-30 mm. long; peduncles 2-4 cm. long, racemes 5-10 cm. long, densely flowered; flowers 14-18 mm. long, pedicels 4-6 mm. long, spreading-pubescent, bracts deciduous; upper calyx-lip notched or deeply lobed, lower tridentate; petals blue, banner with yellow center, almost as wide as long, keel ciliate on upper edges; ovules 4 or 5, pods and seeds not seen.

Rocky fields and hilltops, Upper Sonoran Zone; eastern Washington to Modoc County, California. Type locality: "on high stony ridges, from near The Dalles eastward, in Oregon and Washington." May.

Lupinus saxosus var. *subsericeus* (Robinson) C. P. Smith. (*Lupinus subsericeus* Robinson ex Piper, Contr. U.S. Nat. Herb. 11: 354. 1906.) Differing only in lacking spreading hairs. Hill-sides, Upper Sonoran Zone; eastern Washington and Oregon. Type locality: Ellensburg, Kittitas County, Washington.

83. *Lupinus árticus* S. Wats. Arctic Lupine. Fig. 2642.

Lupinus árticus S. Wats. Proc. Amer. Acad. 8: 526. 1873.

Lupinus borealis Heller, Muhlenbergia 8: 82. 1912.

Lupinus yukonensis Greene, Leaflets Bot. Obs. 2: 233. 1912.

Villous or glabrate, 2-4 dm. tall, erect or ascending; stems slender or stouter and sub-fistulous. Leaves few, or number increased by axillary clusters, more or less villous below and subvillous to glabrous above; stipules 15-25 mm. long, lower conspicuous; petioles 10-30 cm. long, slender or subfistulous; leaflets 6-9, oblanceolate, largest about 60 by 12 mm.; peduncles 3-8 cm. long, racemes 6-12 cm. long; flowers 16-18 mm. long, spreading, pedicels 4-8 mm. long, bracts subpersistent or deciduous, 5-8 mm. long; calyx subsymmetrical, subvillous, upper lip bidentate, lower entire or tridenticulate; petals broad, blue to lilac, banner glabrous, well reflexed, suborbicular, keel arcuate, non-ciliate or ciliate; pods and seeds not seen.

Hudsonian and Canadian Zones; northern Washington to the arctic coast of Alaska and Canada. Type locality: Bear Lake, sources of the Mackenzie River system. July.

Represented southward by the following:

Lupinus árticus var. *prunophilus* (M. E. Jones) C. P. Smith. (*Lupinus Wyethii* S. Wats. as to plants of Spalding, not Wyeth.) (*Lupinus prunophilus* M. E. Jones, Contr. West. Bot. No. 13: 7, 1910.) Keel ciliate on upper edges; coarser in all its parts and more villous, largest leaflets to 8 cm. long. Colorado and Utah to eastern Washington and British Columbia; mountain sides where the snow melts early, the annual growths short-lived. Type locality: Mammoth Hills, Juab County, Utah.

Lupinus árticus var. *tetonensis* (E. Nels.) C. P. Smith. (*Lupinus humicola tetonensis* E. Nels. Bot. Gaz. 30: 120. 1900.) Northwestern Wyoming and central Washington, eastern foothill valleys of the Cascades. Type locality: Teton Mountains, Lincoln County, Wyoming. Keel ciliate, stems and petioles glabrate.

Lupinus árticus var. *Cottonii* C. P. Smith. (*Lupinus Cottonii* C. P. Smith, Bull. Torrey Club 51: 309. 1924.) A reduced subalpine phase of the last with longest petioles only 18 cm. long and smaller flowers. Subalpine meadows, near snow line, Cascades of Yakima County, Washington. Type locality: head of Hell Roaring River (Creek), Mount Adams.

Lupinus árticus var. *subalpinus* (Robinson) C. P. Smith. (*Lupinus subalpinus* Robinson ex Piper, Contr. U.S. Nat. Herb. 11: 356. 1906.) Keel non-ciliate or ciliate, leaflets cuneate to spatulate, rounded or obtuse at apex. Subalpine meadows of central and northern Washington. Type locality: "Cascades to Fort Colville, 1860, Dr. Lyall."

Lupinus árticus var. *humicola* (A. Nels.) C. P. Smith. (*Lupinus humicola* A. Nels. Bull. Torrey Club 25: 204. 1898.) Stems usually slender and without spreading hairs; leaflets sparsely but persistently appressed-pubescent above. Central Wyoming and eastern foothill valleys of the Cascades in Washington. Type locality: Laramie hills, Albany County, Wyoming.

84. *Lupinus magníficus* M. E. Jones. Magnificent Lupine. Fig. 2643.

Lupinus magníficus M. E. Jones, Contr. West. Bot. No. 8: 26. 1898.

Sublanate and long-villous, erect, 6-12 dm. tall, acaulescent. Leaves crowded at the base, petioles 15-20 cm. long, leaflets about 7, 30-40 by 6-10 mm., acute, hairy on both sides; peduncles 10-30 cm. long, racemes 30-45 cm. long; flowers 16-18 mm. long, more or less verticillate, bracts deciduous, pedicels stout, 4 mm. long, spreading-pubescent; upper calyx-lip bifid, lower entire; petals pinkish purple, banner glabrous, suborbicular, emarginate, the yellow center changing to dark purple, keel yellow, arcuate, ciliate above on the very short, upturned acumen; ovules about 10, pods and seeds not seen.

Gravelly washes, Upper Sonoran Zone; desert mountains of Inyo County, California. Type locality: Pleasant Canyon, Panamint Mountains, Inyo County, California, May-June.

Lupinus magníficus var. *glarécola* M. E. Jones, Contr. West. Bot. No. 8: 26. 1898. Flowers only 10-12 mm. long, pedicels slender, about 8 mm. long, racemes 20-30 cm. long. Gravelly soil, known only from the type locality, Lone Pine, Inyo County, California.

Lupinus magnificus var. *hespérius* (Heller) C. P. Smith in Jepson, Man. Fl. Pl. Calif. 533. 1925. (*Lupinus hesperius* Heller, Muhlenbergia 2: 212. 1906.) About 2 dm. tall; flowers 13–15 mm. long, pedicels stout, 3–4 mm. long; racemes about 10 cm. long; upper calyx-lip bifid, lower tridentate, keel straight. In coarse sand, known only from the type locality, near Bishop, Inyo County, California.

4. *ULEX* L. Sp. Pl. 741. 1753.

Shrubs with stiff spinescent branches, and simple stiff and prickly leaves. Flowers solitary or racemose, yellow. Calyx membranous, usually yellowish, deeply divided into two lips, the upper lip 2-toothed, the lower 3-toothed, the teeth short. Standard ovate, the wings and keel oblong, obtuse. Stamens monadelphous. Ovary several to many-ovuled. Pod ovoid to linear, seeds strophiolate. [The ancient Latin name.]

About 20 species, natives of eastern Europe. Type species, *Ulex europaeus* L.

1. *Ulex europaeus* L. Furze, Gorse, Prickly Broom. Fig. 2644.

Ulex europaeus L. Sp. Pl. 741. 1753.

Bushy shrub, 1–2 m. high, more or less pubescent throughout, the branches very leafy, spine-tipped. Leaves acicular, 5–15 mm. long; flowers solitary in the axils on short lateral twigs; pedicels 5 mm. long; calyx 10–15 mm. long, nearly equaling the corolla.

Native of Europe; escaped from cultivation and often well established on the Pacific Coast from Vancouver Island to central California. April–July.

5. *CYTISUS* [Tourn.] L. Sp. Pl. 739. 1753.

Shrubs, with green, leafy or sometimes nearly leafless, more or less angular branches. Leaves palmately or pinnately 3-foliolate, the leaflets entire. Flowers terminal, solitary or racemose, usually yellow. Calyx 2-lipped, campanulate, the teeth short. Standard ovate or orbicular; wings oblong or ovate; keel straight or curved. Stamens monadelphous; pods compressed, several-seeded; seeds strophiolate. [Name from Cythrus, one of the Cyclades, where the first species was found.]

A genus of about 45 species, natives of Europe, western Asia, and northern Africa. Type species, *Cytisus hirsutus* L.

Branches often nearly leafless and broom-like; calyx-lips rounded and entire.

Flowers white, 10 mm. long; style 5 mm. long, slightly curved.

1. *C. multiflorus*.

Flowers bright yellow, 18–20 mm. long; style 10–15 mm. long.

2. *C. scoparius*.

Branches leafy; calyx silky-pubescent, the lower lip entire, acute, the upper with 2 acute lobes; flowers yellow.

3. *C. monspessulanus*.

1. *Cytisus multiflorus* (Ait.) Sweet. White-flowered Broom. Fig. 2645.

Spartium multiflorum Ait. Hort. Kew. 3: 21. 1789.

Cytisus albus Link, Enum. Hort. Ber. 2: 241. 1822.

Cytisus multiflorus Sweet, Hort. Brit. 112. 1827.

Shrub, 1–2 m. high, with slender angled branches, often nearly leafless. Leaflets 1–3, narrowly oblong to oblong-obovate, pubescent on both surfaces; flowers solitary or in pairs in the axils; pedicels 8–12 mm. long; calyx-lips short, rounded, merely notched at apex; petals white, about 1 cm. long; style curved, 5 mm. long; pod appressed-pubescent.

Native of Spain and northern Africa; naturalized in western Oregon and Washington. May–June.

2. *Cytisus scoparius* (L.) Link. Scotch Broom. Fig. 2646.

Spartium scoparium L. Sp. Pl. 709. 1753.

Cytisus scoparius Link, Enum. Hort. Ber. 2: 241. 1822.

Shrub 1–2 m. high, with angular naked or sparingly leafy broom-like branches. Leaves 1–3-foliolate; petioles 2–10 mm. long; leaflets 4–8 mm. long, obovate, acute or mucronate-tipped; flowers bright yellow, solitary or 2 or 3 together in the axils of the leaves, about 2 cm. long; pedicels 6–10 mm. long; pod ciliate on the margins, otherwise glabrous.

Native of Europe, escaped from cultivation and frequently found along roadsides in western Washington to central California. April–June.

3. *Cytisus monspessulanus* L. French Broom. Fig. 2647.

Cytisus monspessulanus L. Sp. Pl. 740. 1753.

Cytisus candicans Lam. Fl. Fr. 2: 623. 1778.

Genista candicans L. Moen. Acad. 4: 284. 1751.

Shrub 1–3 m. high, the branches angled, leafy, villous when young. Leaves short-petioled, 3-foliolate; leaflets obovate or obovate-oblong, mucronulate, 1–2 cm. long, pubescent beneath, glabrous or nearly so above; racemes subcapitate, 3–9-flowered, terminating short lateral branchlets; flowers bright yellow, fragrant; pods rufous-villous.

Native of the Canary Islands, escaped from gardens in western Washington, Oregon, and northern California. March–June.

6. *MEDICAGO* [Tourn.] L. Sp. Pl. 778. 1753.

Annual or perennial herbs, in one southern European species shrubby, with small pinnately 3-foliolate leaves, the leaflets usually toothed, the stipules adnate. Flowers

small, yellow or violet, in 2-3-flowered umbels or several- to many-flowered axillary heads or racemes. Calyx-teeth short, nearly equal. Standard obovate or oblong; wings oblong; keel obtuse. Stamens diadelphous. Styles subulate; pod curved or spirally coiled, reticulated or spiny, indehiscent, 1- to several-seeded. [Name Greek, from Medea, whence the Medic, or Lucerne, was derived.]

A genus of about 50 species, natives of Europe, Asia, and Africa. Type species, *Medicago sativa* L.

Flowers blue; perennial with deep tap root.

1. *M. sativa*.

Flowers yellow.

Pod reniform, 1-seeded; perennials.

2. *M. lupulina*.

Pod spirally coiled, several-seeded; plants strictly annual.

Margins of pods armed with prickles.

Leaflets with a conspicuous dark spot.

3. *M. arabica*.

Leaflets green throughout.

4. *M. hispida*.

Margins of pods unarmed.

5. *M. apiculata*.

1. *Medicago sativa* L. Alfalfa, Lucerne. Fig. 2648.

Medicago sativa L. Sp. Pl. 778. 1753.

Medicago media Pers. Syn. Pl. 2: 356. 1805.

Medica media Fourr. Ann. Soc. Linn. Lyons II. 16: 359. 1868.

Perennial from an elongated taproot, much branched, decumbent or ascending, 3-8 dm. high, glabrous or with a few scattered hairs when young. Leaves petioled; leaflets oblanceolate or obovate, 10-25 mm. long, dentate above, obtuse to emarginate at apex, cuneate at base; stipules entire; flowers in a short dense raceme, violet; petals about 8 mm. long; pod coiled into 2 or 3 spirals, unarmed, pubescent.

Extensively cultivated in the Pacific States and often escaped along roadsides and waste places. Introduced from Europe. Purple Medic. May-Aug.

2. *Medicago lupulina* L. Black Medic. Fig. 2649.

Medicago lupulina L. Sp. Pl. 779. 1753.

Medica lupulina Scop. Fl. Carn. ed. 2: 88. 1772.

Annual or sometimes perennial, pubescent, branched at the base, the branches procumbent or ascending, 3-6 dm. long. Leaves petioled; leaflets obovate to nearly orbicular, 10-15 mm. long, denticulate above; stipules entire; flowers in short spikes on slender peduncles, yellow, scarcely 2 mm. long; pods smooth, reniform, only the acuminate tip coiled, black when ripe, 1-seeded.

Native of Europe; widely distributed, usually growing in moist fields. April-July.

Medicago lupulina var. *cupaniæna* (Guss.) Boiss. Fl. Orien. 2: 105. 1872. (*Medicago cupaniæna* Guss. Fl. Sic. Syn. 2: 362. 1844.) Perennial, the branches rooting and forming dense mats. A troublesome lawn weed, especially in California. Native of Europe and Asia.

3. *Medicago arabica* All. Spotted Bur-clover or Medic. Fig. 2650.

Medicago arabica All. Fl. Ped. 1: 315. 1785.

Medicago cordata Desr. Lam. Encycl. 3: 636. 1789.

Medicago maculata Sibth. Fl. Oxon. 232. 1794.

Annual, branching from the base, the branches decumbent or ascending, 2-6 dm. long, glabrous or nearly so. Leaves usually long-petioled; leaflets broadly obovate or obcordate, 10-25 mm. long, conspicuously marked with a large central dark spot, shallow-denticulate, the teeth not acicular; peduncles 2-5-flowered; pods compressed and coiled into a spiral, 5-6 mm. broad, the edges grooved between the rows of prickles.

Native of southeastern Europe and Persia; sparingly introduced in the Pacific States. April-June.

4. *Medicago hispida* Gaertner. Bur-clover. Fig. 2651.

Medicago hispida Gaertner, Fruct. 2: 349. 1791.

Medicago denticulata Willd. Sp. Pl. 3: 1414. 1800.

Annual, glabrous or with a few appressed hairs, branched from the base, the branches spreading or ascending, 2-8 dm. long. Leaves petioled; leaflets obovate or obcordate, 10-15 mm. long, sharply denticulate; stipules with several elongated acicular teeth; peduncles slender, 2-5-flowered; pods coiled into a spiral of 2 or 3 coils, reticulate, the keeled edge armed on either side by a row of curved or hooked prickles.

Native of southern Europe; widespread over the Pacific States, especially in the Upper Sonoran Zone. The hooked prickles of the burs are excellent illustrations of adaptations to animal distribution. March-June.

5. *Medicago apiculata* Willd. Smooth-burred Medic. Screw-clover. Fig. 2652.

Medicago apiculata Willd. Sp. Pl. 3: 1414. 1800.

Annual, the stems branching from the base, the branches ascending or prostrate, 2-4 dm. long. Leaves petioled; leaflets broadly obovate or obcordate, denticulate above, 5-15 mm. long, sparsely pubescent; peduncles shorter than the petioles, 2-5-flowered; pods coiled into 3-5 spirals, 4-5 mm. broad, strongly reticulate, without prickles.

Native of Europe; sparingly but widely distributed in the Pacific States. April-June.

Medicago orbicularis All. Fl. Ped. 1: 314. 1785. Annual, sparsely villous-pubescent and glandular throughout, the stems branching from the base. Leaves petioled; leaflets narrowly obovate, merely obtuse at apex; peduncles slender, recurved, 1-2-flowered; pods coiled into 5-6 closely pressed spirals, 10-12 mm. broad, reticulate but without prickles. Native of Europe, sparingly introduced in southern California (Santa Ana).

7. MELILÔTUS Juss. Gen. Pl. 356. 1789.

Annual or biennial herbs, with pinnately 3-foliolate petioled leaves, and small white or yellow flowers in racemes. Calyx-teeth nearly equal. Standard obovate, wings oblong and keel obtuse. Stamens diadelphous. Ovary few-ovuled; style filiform. Pod ovoid, straight, indehiscent or at length 2-valved. [Greek, meaning honey-lotus.]

About 20 species, natives of the Old World. Type species, *Melilotus officinalis* (L.) Lam.

Flowers white.

1. *M. alba*.

Flowers yellow.

Flowers about 5 mm. long; leaves obtuse or acutish, not truncate.

2. *M. officinalis*.

Flowers about 2.5 mm. long; leaves truncate or retuse.

3. *M. indica*.

1. *Melilotus alba* Desv. White Melilot, White Sweet-clover. Fig. 2653.

Melilotus alba Desv. ex Lam. Encycl. 4: 63. 1797.

Melilotus vulgaris Willd. Enum. Hort. Ber. 790. 1809.

Annual with erect stems, 1-3 m. high, glabrous or the nascent parts finely pubescent. Leaves petioled, distant; leaflets oblong-ob lanceolate, truncate, 1-2 cm. long, serrate; racemes numerous, slender. 5-10 cm. long; pedicels 2 mm. long; petals white, 4-6 mm. long; pod ovoid, glabrous, 3 mm. long.

Native of Eurasia; widely distributed in the Pacific States, in the southern part confined to river bottoms and moist situations. May-Aug.

2. *Melilotus officinalis* (L.) Lam. Yellow Melilot, Yellow Sweet-clover. Fig. 2654.

Trifolium M. officinalis L. Sp. Pl. 765. 1753.

Melilotus officinalis Lam. Fl. Franc. 2: 594. 1778.

Annual, with tall erect stems 1-3 m. high. Leaflets ovate-lanceolate to oblanceolate, 10-25 mm. long, sharply and irregularly serrate, obtuse or acutish at apex; flowers yellow, about 5 mm. long; pod ovoid, strongly reticulate, pubescent.

Native of Eurasia, and sparingly naturalized in the Northwest from Washington to northwestern California. May-Aug.

3. *Melilotus indica* (L.) All. Indian Melilot. Fig. 2655.

Trifolium M. indica L. Sp. Pl. 765. 1753.

Melilotus indica All. Fl. Ped. 1: 308. 1785.

Annual, glabrous or the leaves and inflorescence sparsely appressed-pubescent, the stems erect, 2-7 dm. high, with ascending or spreading branches. Leaflets cuneate-oblong to obovate, obtuse or truncate, 15-25 mm. long, denticulate; racemes many, 2-10 cm. long; flowers 2.5 mm. long, yellow; pods ovoid, reticulate, glabrous.

Native of Europe and Asia; very common in the valleys and foothills throughout California. Often cultivated as a cover crop in orchards. April-Aug.

8. TRIFOLIUM [Tourn.] L. Sp. Pl. 764. 1753.

Annual or perennial herbs, with palmately 3-foliolate leaves, and adnate stipules, the leaflets usually denticulate. Flowers yellow, white, or commonly purple in heads or short spikes. Calyx 5-cleft, with nearly equal or in some species unequal teeth, persistent. Petals usually persistent, their claws all more or less adnate to the staminal tube, or the standard sometimes free. Stamens diadelphous. Pods membranous, shorter or scarcely exceeding the calyx, 1-8-seeded, dehiscent or indehiscent. [Name Latin, in reference to the three leaflets.]

About 275 species, most abundant in the north temperate zone, a few species in South America and South Africa; abundant in western North America, especially California. Type species, *Trifolium pratense* L.

Heads not involucrate.

Annuals.

Flowers pedicellate, reflexed in age; calyx glabrous except in *T. bifidum*.

Calyx 5-nerved; flowers yellow.

Calyx 10-nerved; flowers purple.

Flowers sessile, not reflexed in age; calyx densely villous.

Perennials.

Peduncles axillary.

Peduncles terminal or subterminal.

Calyx glabrous.

Calyx hairy or villous.

Leaflets 5-9.

Leaflets 3.

Heads globose or ovoid.

Heads long-peduncled.

Heads sessile in the uppermost leaves.

Heads distinctly oblong.

I. AGRARIA.

II. GRACILENTA.

IX. ARVENSIA.

III. REPENTIA.

IV. ALTISSIMA.

VI. MACROCEPHALA.

V. LONGIFEDIA.

VIII. PRATENSIA.

VII. PLUMOSA.

Heads involucrate.

Flowers not inflated; involucre bracts united.

Involucre cup-shaped.

Involucre rotate.

Flowers inflated in age; involucre bracts distinct, sometimes much reduced.

X. CYATHIFERA.

XI. INVOLUCRATA.

XII. FUCATA.

I. AGRARIA.

Heads 8–12 mm. long; standard dilated, not folded over the pod.

Heads 4–6 mm. long; standard not dilated, folded over the pod.

1. *T. procumbens*.

2. *T. dubium*.

II. GRACILENTA.

Calyx not ciliate on the margins.

Plants especially the peduncles and calyx pubescent.

Plants glabrous throughout.

Leaves obovate and retuse at the apex, the serrations not setaceous.

Leaves narrowly lanceolate, acute, aristate, the serrations conspicuously setaceous.

3. *T. bifidum*.

4. *T. gracilentum*.

5. *T. Palmeri*.

6. *T. ciliolatum*.

Calyx conspicuously ciliate on the margins, plant otherwise glabrous or nearly so.

III. REPENTIA.

Calyx and whole plant villous-pubescent.

Calyx glabrous or sparsely pubescent, plant otherwise glabrous or nearly so.

Stems ascending; flowers pink; calyx pubescent in the sinuses between the teeth.

Stems creeping; flowers white; calyx glabrous or sparsely pubescent at the base.

7. *T. Breweri*.

8. *T. hybridum*.

9. *T. repens*.

IV. ALTISSIMA.

Flowers distinctly pedicellate, reflexed in age.

Rachis of the head flower-bearing to the apex.

Heads large, 2 cm. or more high; standard broad, rounded at apex.

Corolla red; leaflets oblong to oblong-lanceolate, pallid and strongly nerved.

Corolla white; leaflets ample, ovate, bright green and thin.

Heads small, 10–15 mm. high; standard narrow, acutish.

Rachis prolonged above the flowers as a sterile projection, especially evident in the older heads.

Flowers sessile, not evidently reflexed in age; calyx more or less distorted in age.

10. *T. Beckwithii*.

11. *T. Howellii*.

12. *T. Bolanderi*.

13. *T. productum*.

14. *T. Douglasii*.

V. LONGIPEDIA.

Calyx conspicuously plumose, with widely spreading hairs; standard rounded at apex; flowers strongly reflexed; peduncles often recurved at apex.

Calyx merely hairy, with ascending or appressed hairs; standard acute; peduncles erect.

Flowers pedicellate, reflexed in age.

Flowers sessile or subsessile, not reflexed in age.

15. *T. eriocephalum*.

16. *T. oreganum*.

17. *T. longipes*.

VI. MACROCEPHALA.

Flowers on very short pedicels, purple, somewhat reflexed at age only in *Thompsonii*.

Corolla 2 cm. long; leaflets denticulate.

Leaflets linear-lanceolate, the longer 4–7 cm. long; calyx-teeth thinly villous-pubescent with somewhat appressed hairs.

Leaflets obovate, 1–2 cm. long; calyx-teeth densely plumose, with widely spreading hairs.

Corolla 1 cm. long; leaflets entire.

Peduncles densely villous, shorter than the leaves.

Peduncles sparingly pubescent, well exceeding the leaves.

Flowers on pedicels about 2 mm. long, yellow; leaflets denticulate.

18. *T. Thompsonii*.

19. *T. macrocephalum*.

20. *T. Andersonii*.

21. *T. monoense*.

22. *T. Lemmonii*.

VII. PLUMOSA.

Only one species.

23. *T. plumosum*.

VIII. PRATENSIA.

Only one species.

24. *T. pratense*.

IX. ARVENSIA.

Heads cylindrical; flowers red, pink, or white; introduced species.

Corolla pink or white, 2–3 mm. long, much shorter than the calyx-teeth.

Corolla red, exceeding the calyx.

Heads globose to oblong-ovoid; flowers purple; native species.

Corolla exceeding or about equaling the calyx.

Heads sessile in pairs in the axils of the uppermost leaves.

Heads solitary on evident more or less elongated peduncles.

Corolla well exerted.

Heads globose-ovoid; flowers 15 mm. long.

Heads long-ovoid; flowers 8–10 mm. long.

Corolla barely or not at all exceeding the calyx.

Corolla much shorter than the calyx and fairly concealed.

Ovary pubescent.

Ovary glabrous.

25. *T. arvense*.

26. *T. incarnatum*.

27. *T. Macraei*.

28. *T. amoenum*.

29. *T. dichotomum*.

30. *T. albobiprereum*.

31. *T. columbinum*.

32. *T. olivaceum*.

X. CYATHIFERA.

Lobes of the involucre toothed.

Calyx-teeth with elongated, simple or forked, awn-like apices.

Calyx glabrous, the teeth several-forked.

33. *T. cyathiferum*.

Calyx pubescent, the teeth with a simple awn or the upper tooth with three awns.

Corolla 6–7 mm. long, shorter than the calyx.

34. *T. barbigerum*.

Corolla 10–12 mm. long, exceeding the calyx.

35. *T. Grayi*.

Calyx-teeth ciliated, the apex with a short simple apiculation.

36. *T. microdon*.

Lobes of the involucre entire, heads small, pubescent.

37. *T. microcephalum*.

XI. INVOLUCRATA.

Perennials.

Plants villous; heads 1–6-flowered; involucre inconspicuous; corolla cream-colored, the keel purple.

38. *T. monanthum*.

Plants glabrous; heads large, many-flowered, purple.

Involucre distinctly lobed, the lobes irregularly toothed.

39. *T. fimbriatum*.

Involucre prominently laciniate-toothed, but not lobed.

40. *T. spinulosum*.

Annuals.

Plants glabrous.

Calyx 10-nerved.

Keel prominently apiculate; involucre lobed, the lobes several-toothed.

41. *T. appendiculatum*.

Keel not apiculate.

Corolla little exceeding the calyx; involucre divided almost to base into subulate teeth.

Calyx glabrous.

42. *T. oliganthum*.

Calyx pilose.

43. *T. trichocalyx*.

Corolla well exceeding the calyx; involucre lobed, the lobes laciniately toothed.

Calyx-teeth subulate, entire.

44. *T. melananthum*.

Calyx-teeth 3- to several-toothed.

45. *T. polyodon*.

Calyx 20–25-nerved.

Involucre distinctly lobed and the lobes laciniately toothed; calyx-teeth subulate, entire.

46. *T. variegatum*.

Involucre unevenly laciniate-toothed but not lobed; calyx-teeth abruptly attenuate, usually with one or two lateral teeth.

47. *T. tridentatum*.

Plants viscid-pubescent and clammy.

48. *T. obtusiflorum*.

XII. FUCATA.

Flowers large, 10–25 mm. long, cream or yellowish; involucre bracts acute, 6–18 mm. long.

Calyx-teeth elongated, aristate, 2–3-cleft.

49. *T. Gambellii*.

Calyx-teeth entire.

Three lower calyx-teeth well exceeding the tube; corolla 10–15 mm. long.

50. *T. flavulum*.

Three lower calyx-teeth shorter than the tube; corolla 20–30 mm. long.

51. *T. fucatum*.

Flowers 3–6 mm. long, red-purple or ochroleucous.

Involucral bracts evident, extending beyond the calyx-tube.

Involucral bracts broad with broad scarious margins, often toothed.

52. *T. amplexens*.

Involucral bracts narrowly oblong to oblong, green, scarcely or not at all margined.

53. *T. stenophyllum*.

Involucral bracts reduced to a mere ring, no lobes evident.

54. *T. depauperatum*.

1. *Trifolium procumbens* L. Low Hop-clover. Fig. 2656.

Trifolium procumbens L. Sp. Pl. 772. 1753.

Chrysaspis procumbens Desv. Fl. Anjou 338. 1827.

Amarenus procumbens Presl, Symb. Bot. 1: 46. 1830.

Annual, finely appressed-pubescent, the stems slender, decumbent or ascending, 15–40 cm. long. Leaflets 7–15 mm. long, obovate, cuneate at the base, rounded or emarginate at the apex, finely denticulate, the terminal one distinctly stalked; stipules ovate, about 4 mm. long; peduncles 6–25 mm. long; heads globose or short-oval, 8–12 mm. high; flowers yellow, reflexed in age, about 4 mm. long; standard distinctly dilated above, not folded over the pod.

Native of Europe; sparingly introduced in the Pacific States. May–Sept.

2. *Trifolium dubium* Sibth. Shamrock. Fig. 2657.

Trifolium dubium Sibth. Fl. Oxon. 231. 1794.

Trifolium minus Smith, Engl. Bot. pl. 1256. 1799.

Chrysaspis dubia Greene, Pittonia 3: 206. 1897.

Annual, very similar to the preceding species, nearly glabrous, the stems straggling or ascending, 5–50 cm. long, branching. Leaflets obovate, truncate or emarginate, cuneate at the base, the terminal stalked; peduncles 6–25 mm. long; heads nearly globose, 4–6 mm. high; flowers about 3 mm. long, at length reflexed; standard not dilated, folded over the pod.

Native of Europe, frequently established in fields and waysides in the Pacific States. Mainly in the Humid Transition Zone. May–June.

3. *Trifolium bifidum* A. Gray. Notch-leaved or Pinole Clover. Fig. 2658.

Trifolium bifidum A. Gray, Proc. Amer. Acad. 6: 522. 1865.

Annual, pale green and glaucous, the peduncles and calyx more or less villous, the stems erect, very slender, 15–35 cm. high. Leaves long-peduncled; stipules ovate-lanceolate, entire;

leaflets 1–2 cm. long, linear-cuneate, remotely denticulate, deeply bifid at apex, with a mucro in the notch; heads small, 6–15-flowered; calyx-teeth subulate-setaceous, about equaling the minute pale rose-colored corolla; pod included, 1-seeded.

Grassy hillsides and valleys, Upper Sonoran and Transition Zones; southern Oregon to southern California. Type locality: in a ravine between Mount Diablo and the San Joaquin Valley, California. April–June.

Trifolium bifidum var. *decipiens* Greene, Fl. Fran. 1: 24. 1891. (*Trifolium Hallii* Howell, Fl. N.W. Amer. 1: 135. 1898. *Trifolium Greenei* House, Bot. Gaz. 41: 334. 1906.) Distinguished from the species by the broader leaves which are merely retuse or rounded at the apex. Open grassy hillsides and valleys, Upper Sonoran and Transition Zones; Washington to southern California, of wider range and more common than the species. Type locality: San Francisco Bay region, California.

4. *Trifolium gracilentum* Torr. & Gray. Pin-point Clover. Fig. 2659.

Trifolium gracilentum Torr. & Gray, Fl. N. Amer. 1: 316. 1838.

Trifolium denudatum Nutt. Journ. Acad. Phila. II, 1: 152. pl. 24. 1848.

Annual, glabrous, the stems slender, erect or spreading, 1–5 dm. long. Leaves long-petioled; stipules 10–15 mm. long, ovate-lanceolate, membranous; leaflets 6–15 mm. long, obovate, emarginate at the apex; heads long-peduncled, globose or short-ovoid, 6–10 mm. long; pedicels 1–2 mm. long; flowers reflexed in age, the rachis projecting; calyx-teeth longer than the tube, subulate, entire; corolla 5–6 mm. long, well exceeding the calyx, reddish purple or light pink; pod 1–2-seeded.

Grassy slopes, Upper Sonoran and Transition Zones; a common species from British Columbia to northern Lower California. Type locality: California. April–June.

Trifolium gracilentum var. *inconspicuum* Fernald, Zoe 4: 380. 1894. A depauperate form, with the corolla shorter than or barely equaling the calyx, otherwise closely resembling the species. Central and southern California.

5. *Trifolium Palmeri* S. Wats. Palmer's Clover. Fig. 2660.

Trifolium Palmeri S. Wats. Proc. Amer. Acad. 11: 132. 1876.

Trifolium gracilentum var. *Palmeri* McDermott, N. Amer. Trifol. 300. 1910.

Annual, glabrous throughout, the stems erect, branched. Stipules lanceolate, acuminate; leaflets linear-lanceolate, 1–3 cm. long, acute and mucronate at the apex, serrulate, the teeth setaceous; heads globose, 10–15 mm. broad; calyx about 5 mm. long, the tube scarcely over 1 mm. long; corolla rose-purple, 6–7 mm. long; pods 2-seeded.

Confined to the islands off the coast of southern California and Lower California. Type locality: Guadalupe Island, Lower California. April–May.

6. *Trifolium ciliolatum* Benth. Tree Clover. Fig. 2661.

Trifolium ciliatum Nutt. Journ. Acad. Phila. II, 1: 152. 1848. Not Clarke, 1813–16.

Trifolium ciliolatum Benth. Pl. Hartw. 304. 1848.

Annual, pale green and glabrous, the stems erect, 2–6 dm. high, stout and often fistulous; stipules 15–30 mm. long, lanceolate-acuminate; leaflets 15–30 mm. long, oblong to obovate, obtuse, serrulate, often with a large central light-colored spot; heads ovoid, 15–20 mm. long; flowers reflexed in age; calyx-teeth lanceolate, acuminate, conspicuously ciliate; corolla pinkish purple, slightly exceeding the calyx.

Open grassy hillsides or valleys, Upper Sonoran and Transition Zones; Washington to southern California. Type locality: Sacramento Valley, California. April–June.

7. *Trifolium Brèweri* S. Wats. Brewer's or Forest Clover. Fig. 2662.

Trifolium Breweri S. Wats. Proc. Amer. Acad. 11: 131. 1876.

Perennial, pubescent and glaucous, the stems very slender, often diffuse, 15–30 cm. long. Stipules lanceolate; leaflets 6–15 mm. long, obovate, retuse or obtuse at the apex, denticulate; peduncles axillary, curved at the apex in age; heads loosely few-flowered; flowers pedicelled, at length reflexed; calyx 4 mm. long, the tube much shorter than the teeth; corolla rose or creamy white, 6 mm. long.

Open coniferous forests, Arid Transition Zone; southern Oregon to Central California. Type locality: Yosemite Valley, California. May–June.

8. *Trifolium hybridum* L. Alsike or Alsatian Clover. Fig. 2663.

Trifolium hybridum L. Sp. Pl. 766. 1753.

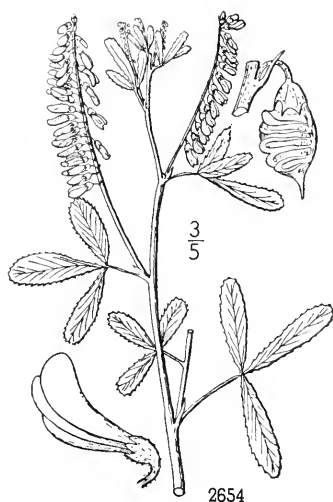
Perennial, glabrous or very nearly so, the stems erect or ascending, 3–6 dm. high, branching, often stout and succulent. Stipules ovate-lanceolate, 12–25 mm. long, acuminate, membranous; leaflets 12–25 mm. long, all short-stalked, obovate, rounded and sometimes emarginate at the apex, cuneate at the base, serrulate with sharp-pointed teeth; heads globose, long-peduncled; flowers pink, 6–8 mm. long, reflexed, pedicels slender, 6–8 mm. long; calyx-teeth subulate, about equaling the tube; corolla much exceeding the calyx-teeth.

In meadows, naturalized from Europe; well established in Washington, Oregon, and northern California. May–Oct.

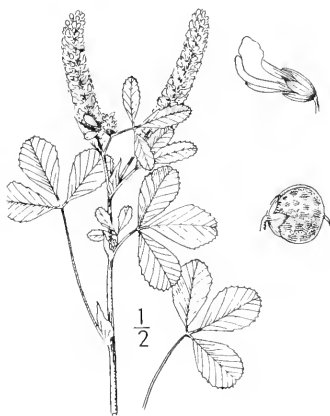
9. *Trifolium repens* L. White Clover. Fig. 2664.

Trifolium repens L. Sp. Pl. 767. 1753.

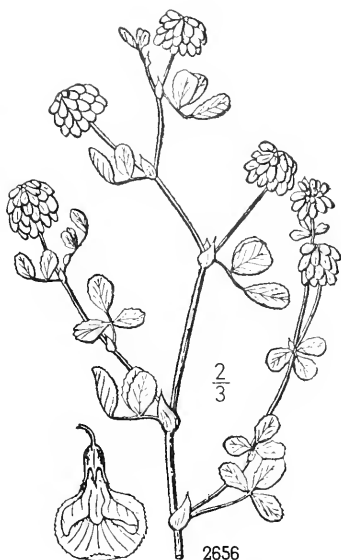
Perennial, glabrous, or with scattered hairs, the stems branching from the base, creeping and rooting at the nodes, 1–3 dm. long. Leaves long-petioled; stipules 4–10 mm. long, ovate-lanceolate, acute, membranous; leaflets 8–20 mm. long, short-stalked, obovate, emarginate or orbiculate, broadly cuneate at the base, denticulate; heads long-peduncled, globose; pedicels 2–4 mm. long;



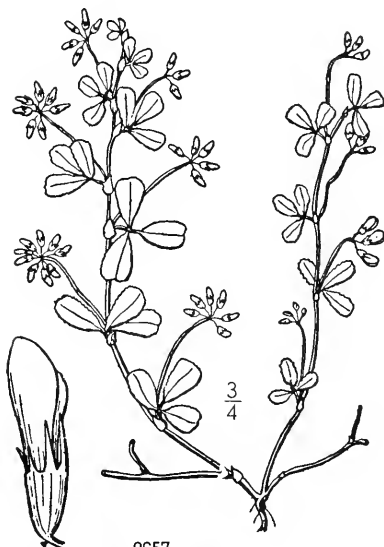
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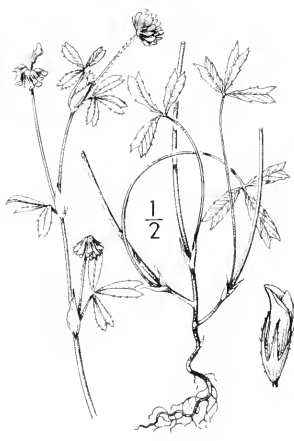
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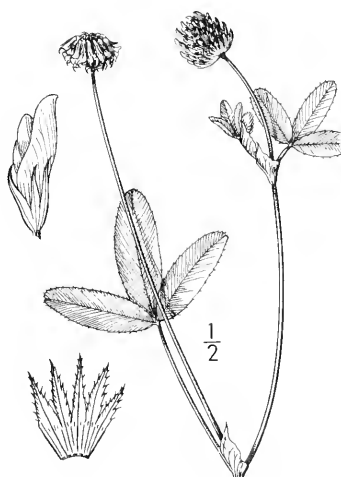
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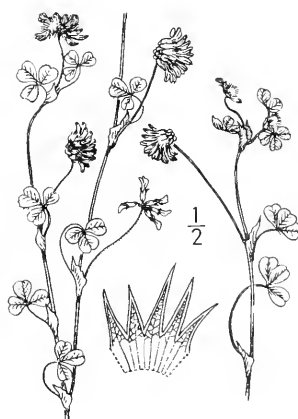
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2654. *Melilotus officinalis*
 2655. *Melilotus indica*
 2656. *Trifolium procumbens*

2657. *Trifolium dubium*
 2658. *Trifolium bifidum*
 2659. *Trifolium gracilentum*

2660. *Trifolium Palmeri*
 2661. *Trifolium ciliolatum*
 2662. *Trifolium Breweri*

flowers white, 4–6 mm. long, reflexed in age; calyx-teeth acuminate, scarcely equaling the tube; corolla 2–3 times as long as the calyx.

In fields and waysides, Transition and Canadian Zones; naturalized from Europe; common from western Washington to northwestern California, and frequent in mountain meadows of the Sierra Nevada. April–Dec.

10. *Trifolium Beckwithii* Brewer. Beckwith's Clover. Fig. 2665.

Trifolium Beckwithii Brewer ex S. Wats. Proc. Amer. Acad. 11: 128. 1876.

Perennial, glabrous throughout; the stems stout, ascending, 1–3 dm. high. Stipules lanceolate to ovate, acute; leaflets 2–4 cm. long, oblong to lanceolate, obtuse or acute, serrate; peduncles appearing terminal; heads globose, 2–3 cm. broad, dense; flowers on very short pedicels, at length reflexed; calyx 7–8 mm. long, the teeth subulate, equaling the tube; corolla red, about 15 mm. long; ovary 2–6-ovuled.

Mountain valleys and meadows, Transition and Canadian Zones; Idaho and eastern Oregon to Nevada and the northern Sierra Nevada, California. Type locality: Sierra Nevada, California. May–July.

11. *Trifolium Howëllii* S. Wats. Howell's Clover. Fig. 2666.

Trifolium Howëllii S. Wats. Proc. Amer. Acad. 23: 262. 1888.

Perennial, glabrous throughout, the stems stout, erect, nearly simple, 5–7 dm. high. Stipules foliaceous, ovate, entire; leaflets 3–6 cm. long, cuneate-oblanccolate to ovate-elliptical; peduncles exceeding the leaves; heads long-ovoid, 15–25 mm. long; flowers short-pedicelled, at length reflexed; calyx 4 mm. long, the teeth subulate, about equaling the tube; corolla white, 10 mm. long; pod 2-ovuled, 1-seeded.

Along streams, Humid Transition Zone; Cow Creek, southern Oregon, to the Siskiyou Mountains, northern California. Type locality: Siskiyou Mountains, Oregon. June–Aug.

12. *Trifolium Bolánderi* A. Gray. Bolander's Clover. Fig. 2667.

Trifolium Bolanderi A. Gray, Proc. Amer. Acad. 7: 335. 1867.

Perennial, glabrous throughout, cespitose, the stems numerous, decumbent or ascending, 1–2 dm. long, sparsely leafy. Leaves mostly basal; stipules ovate, acute, entire; leaflets obcordate to cuneate-oblong, slightly serrulate, 1–2 cm. long; peduncles 5–10 cm. long, slender, terminal or occasionally axillary; heads ovoid, 10–15 mm. long; flowers short-pedicelled, at length reflexed; calyx 3–4 mm. long, the teeth lanceolate, scarcely equaling the tube; corolla pink, 7–8 mm. long; ovary 2-ovuled.

Mountain meadows, Canadian Zone; a rare species of the Sierra Nevada, Mariposa and Fresno Counties, California. Type locality: "Westfall's Meadow, above the Yosemite Valley, at the elevation of 8,000 ft." June–Aug.

13. *Trifolium productum* Greene. Shasta Clover. Fig. 2668.

Trifolium productum Greene, Erythea 2: 181. 1894.

Trifolium Kingii var. *productum* Jepson, Fl. Calif. 2: 304. 1936.

Perennial, glabrous throughout, the stems rather slender, ascending, 1–4 dm. high. Basal leaves long-petioled, those of the stem very short-petioled; stipules broadly lanceolate, entire; leaflets 15–45 mm. long, lanceolate to oblong-lanceolate, spinulose-serrate, acuminate; peduncles exceeding the leaves; heads short-ovoid, 10–15 mm. long, the rachis produced above the head with a few spinescent bracts; flowers short-pedicelled, at length reflexed; calyx-teeth subulate, slightly longer than the tube; corolla rose or purple, 10–12 mm. long.

Moist soil, Canadian Zone; southern Cascade and Siskiyou Mountains, Oregon, to the central Sierra Nevada, California. Type locality: not designated. June–Sept.

14. *Trifolium Douglàsii* House. Douglas' Clover. Fig. 2669.

Trifolium altissimum Dougl. ex Hook. Fl. Bor. Amer. 1: 130. 1830. Not Loisel. 1807.

Trifolium Douglasii House, Bot. Gaz. 41: 335. 1906.

Perennial from a stout taproot, glabrous throughout and pale, the stems solitary or few, erect, 3–6 dm. high. Stipules linear-lanceolate, 2–3 cm. long, the free portion about one-fourth the length, acuminate; leaflets of the basal leaves oblong-elliptical, 15–30 mm. long; those of the stem leaves linear-lanceolate, 3–7 cm. long, very finely serrulate, aristate at apex; heads ovoid, 15–30 mm. long; flowers sessile, crowded; calyx 8 mm. long, becoming contorted, strongly 20-nerved; the teeth somewhat exceeding the tube; corolla purple, about 12 mm. long.

Wet meadows, Arid Transition Zone; northern Idaho and adjacent Washington to the Blue Mountains of Oregon. Type locality: "Between the Spokane River and Kettle Falls of the Columbia." June–July.

15. *Trifolium eriocephalum* Nutt. Woolly-headed Clover. Fig. 2670.

Trifolium eriocephalum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 313. 1838.

Trifolium eriocephalum var. *Butleri* Jepson, Fl. Calif. 2: 302. 1936.

Perennial from a stout fusiform root, the stems erect or decumbent at base, 15–50 cm. high, villous with spreading hairs. Leaves long-petioled; stipules 2–3 cm. long, linear, the free portion attenuate; leaflets oblong-lanceolate, 2–4 cm. long, obtuse, very finely serrulate, villous especially beneath; peduncles more or less recurved at the apex; heads globose to ovoid, 2–2.5 cm. long; flowers very short-pedicellate, all reflexed in age; calyx densely long-villous with spreading hairs, 8 mm. long, the teeth three times as long as the tube; corolla 12–15 mm. long, yellowish; standard broad, rounded at apex; ovary pubescent.

Open prairies in gravelly soil, mainly Humid Transition Zone; western Washington to northwestern California. Type locality: prairies of the Willamette and near Fort Vancouver. May–June.

Trifolium eriocephalum var. *harneyense* (Howell) McDermott, N. Amer. Trifol. 243. 1910. (*Trifolium harneyense* Howell, Fl. N.W. Amer. 134. 1898.) Leaves narrowly linear, acute, otherwise scarcely to be distinguished from the typical species. This is the common form in eastern Oregon, extending from the Blue Mountains to northern Nevada. Type locality: Harney Valley, Oregon.

Trifolium eriocephalum var. *arcuatum* (Piper) McDermott, N. Amer. Trifol. 242. 1910. (*Trifolium arcuatum* Piper, Bull. Torrey Club 28: 39. 1902.) Plants usually glabrous throughout; leaflets narrowly elliptical to oblong-lanceolate, obtuse; lower calyx-tooth twice as long as the other four which scarcely exceed the tube. Meadows, eastern Washington to northern Idaho. Type locality: Simcoe Mountains, Washington.

16. *Trifolium oreganum* Howell. Oregon Clover. Fig. 2671.

Trifolium oreganum Howell, Erythea 1: 110. 1893.

Trifolium multipedunculatum Kennedy, Muhlenbergia 5: 59. 1909.

Perennial, the stems several from a taproot, decumbent or ascending, 1–2 dm. long, herbage nearly glabrous or more or less villous-pubescent. Leaflets mostly obovate to oblanceolate, about 1 cm. long, more or less hairy below, strongly veined and mucronate; heads about 2 cm. broad; calyx villous-pubescent, 10–12 mm. long, the subulate teeth much exceeding the tube; corolla pink to purple, about 15 mm. long.

Moist places, Transition and Canadian Zones; Washington and Idaho, south to northern California. Type locality: eastern base of the Coast Mountains near Waldo, Oregon. June–Aug.

17. *Trifolium longipes* Nutt. Long-stalked Clover. Fig. 2672.

Trifolium longipes Nutt. in Torr. & Gray, Fl. N. Amer. 1: 314. 1838.

Trifolium Rusbyi Greene, Pittonia 1: 5. 1887.

Trifolium Elmeri Greene, Pittonia 3: 223. 1897.

Trifolium caurinum Piper, Erythea 6: 29. 1898.

Trifolium Covillei House, Bot. Gaz. 41: 337. 1906.

Perennial with creeping rootstock, the stems erect, simple, glabrous or sparsely appressed-pubescent, 1–4 dm. high. Stipules foliaceous, lanceolate, entire, 20–25 mm. long; lowest leaves long-petioled, their leaflets oblong or oblong-obovate, 1–2 cm. long; stem leaves with petioles shorter to somewhat longer than the leaflets; leaflets oblong-lanceolate to linear-lanceolate, obtuse or acute, 2–3 cm. long, pallid, glabrous above, appressed-pubescent beneath; heads long-peduncled, broadly cuneate at base, about 15 mm. broad; calyx 7–9 mm. long, more or less villous-pubescent, the subulate teeth much exceeding the tube; corolla white, 10–12 mm. long.

Mountain meadows, Transition and Canadian Zones; Olympic and Cascade Mountains, Washington, to Idaho, south to the Sierra Nevada, California. Type locality: "Valleys of the central chain of the Rocky Mountain ranges, and on the moist plains of the Oregon, as low as the Wahlamet [Willamette], forming extensive fields of herbage." A variable species and many specific and varietal segregates have been proposed. June–Sept.

18. *Trifolium Thompsonii* Morton. Thompson's Clover. Fig. 2673.

Trifolium Thompsonii Morton, Journ. Wash. Acad. 23: 270. 1933.

Perennial, with pale green appressed villous-pubescent herbage, the stems stout, 2–6 dm. high. Lower leaves long-petioled, the upper short-petioled; stipules lanceolate, mostly adnate to the petiole, entire; leaflets 7, linear, the central up to 7 cm. long, pungently acute, setaceously denticulate; peduncles 1 or 2 on a stem, 5–15 cm. long; heads globose, many-flowered, 4–5 cm. broad; flowers purple, short-pedicelled, spreading or reflexed in age; calyx-teeth narrowly subulate; corolla 18–22 mm. long, the standard rounded at apex.

Sagebrush slopes, Arid Transition Zone; Chelan County, Washington. Type locality: Swakone Creek, Chelan County, Washington. June–July.

19. *Trifolium macrocephalum* (Pursh) Poir. Large-headed Clover. Fig. 2674.

Lupinaster macrocephalus Pursh, Fl. Amer. Sept. 2: 336. 1814.

Trifolium macrocephalum Poir. in Lam. Encycl. Suppl. 5: 336. 1817.

Trifolium megacephalum Nutt. Gen. 2: 105. 1818.

Perennial, sparsely villous throughout, on the upper surfaces of the leaves soon glabrate, the stems stout, 1–2 dm. high. Leaves 5–7-foliolate, the lower long-petioled; stipules ovate-oblong, about 2 cm. long, remotely serrate; leaflets 1–2 cm. long, cuneate or obovate, obtuse, mucronate, serrulate; heads short-peduncled, short-ovoid, about 3 cm. long; calyx villous, the lobes subulate, plumose, 10–15 mm. long; corolla purplish, about 2 cm. long; pod stipitate, glabrous, 6-ovuled.

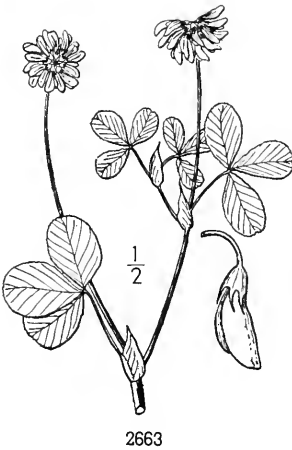
Wet meadows, Arid Transition and Sonoran Zones; British Columbia and Idaho to northeastern California, and Nevada. Type locality: The Dalles, Oregon. April–May.

20. *Trifolium Andersønnii* A. Gray. Anderson's Clover. Fig. 2675.

Trifolium Andersonii A. Gray, Proc. Amer. Acad. 6: 522. 1865.

Perennial, with a deep taproot, dwarf and caespitose, the branching root crown forming dense leafy mat, densely silky-villous throughout. Leaves 3–5-foliolate, stipules lanceolate, acuminate, entire; leaflets 1–2 cm. long, cuneate-oblong to oblanceolate, acute and aristate, entire; peduncles often shorter than the leaves and appearing axillary; heads subglobose, 2–4 cm. broad, subtended by a rudimentary scarious involucre; corolla purple, 12–15 mm. long, a little longer than the subulate plumose calyx-teeth; pods tomentose.

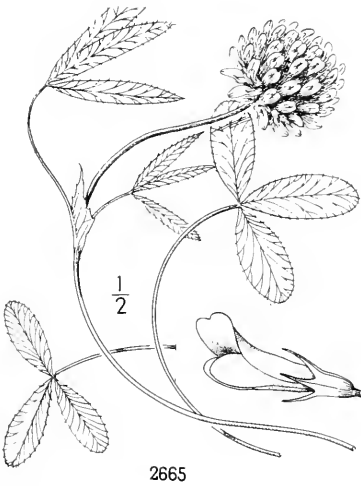
Dry mountain slopes and valleys, Arid Transition and Canadian Zones; southern Oregon to northeastern California and adjacent Nevada. Type locality: mountains near Carson City, Nevada. June–July.



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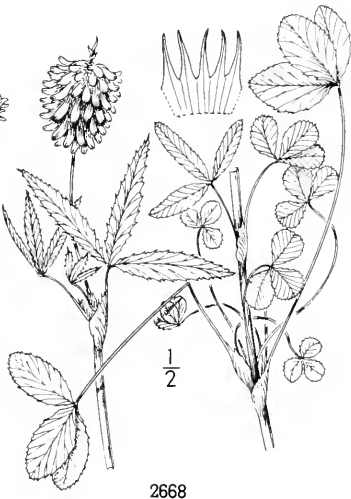
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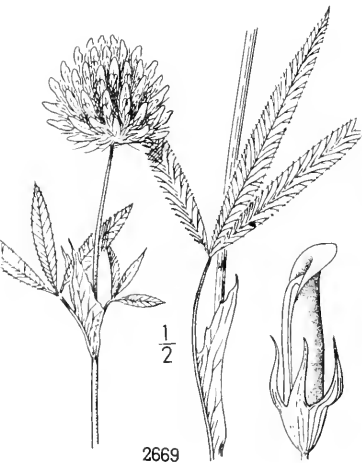
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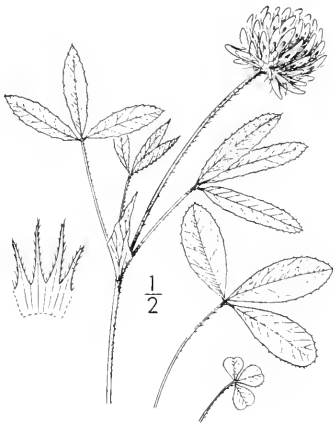


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2663. *Trifolium hybridum*
2664. *Trifolium repens*
2665. *Trifolium Beckwithii*

2666. *Trifolium Howellii*
2667. *Trifolium Bolanderi*
2668. *Trifolium productum*

2669. *Trifolium Douglasii*
2670. *Trifolium eriocephalum*
2671. *Trifolium oreganum*



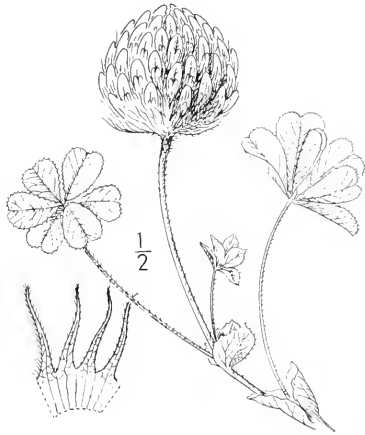
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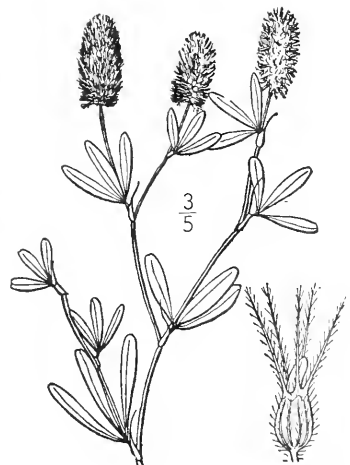
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2672. *Trifolium longipes*
 2673. *Trifolium Thompsonii*
 2674. *Trifolium macrocephalum*

2675. *Trifolium Andersonii*
 2676. *Trifolium monoense*
 2677. *Trifolium Lemmonii*

2678. *Trifolium plumosum*
 2679. *Trifolium pratense*
 2680. *Trifolium arvense*

21. *Trifolium monoense* Greene. Mono Clover. Fig. 2676.

Trifolium monoense Greene, *Erythea* 2: 181. 1894.

Perennial, with a deep taproot, caespitose, the short branching root crown forming mats. Leaves on slender petioles; stipules membranous, conspicuously crowded on the ends of the root crown branches; leaflets 4-6, 6-10 mm. long, narrowly obovate, abruptly and sharply acute, entire, appressed-villous; peduncles 3-7 cm. long; heads subglobose, 16-18 mm. broad and scarcely as long; calyx densely villous; corolla purple, 8-10 mm. long, scarcely exceeding the subulate plumose calyx-teeth.

High mountains, Boreal Zones; White Mountains, Mono County, California. Type locality: White Mountains, California. July-Aug.

22. *Trifolium Lemmonii* S. Wats. Lemmon's Clover. Fig. 2677.

Trifolium Lemmonii S. Wats. *Proc. Amer. Acad.* 11: 127. 1876.

Perennial from a thick root, glabrous, the stems rather slender, 15-20 cm. high. Leaves petioled; stipules ovate, acuminate, coarsely toothed; leaflets 6-12 mm. long, obovate, obtuse, sharply serrate, mucronate; peduncles mostly terminal, 5-7 cm. long; heads 2 cm. long; flowers reflexed in age, on slender pedicels; calyx-tube pubescent, 3-4 mm. long, the teeth subulate; corolla bright yellow, about 10 mm. long, the standard strongly hooded; ovary slightly pubescent, 2-ovuled.

Mountain slopes and valleys, Canadian Zone; southeastern Oregon to the northern Sierra Nevada and adjacent Nevada. July.

23. *Trifolium plumosum* Dougl. Feather Clover. Fig. 2678.

Trifolium plumosum Dougl. ex Hook. *Fl. Bor. Amer.* 1: 130. 1830.

Perennial from creeping rootstocks, the stem erect, 3-8 dm. high, densely pubescent with upwardly appressed hairs. Basal leaves with petioles 1-2 dm. long; leaflets linear, tapering at both ends, 5-8 cm. long, 5-10 mm. wide, finely appressed-pubescent; heads elongated, 4-6 cm. long; calyx densely villous, 1 cm. long, the teeth longer than the tube; corolla white or pink, 12-15 mm. long.

Meadows, Canadian Zone; Blue Mountains of Oregon to western Idaho. Type locality: alluvial soils, Blue Mountains, Oregon. June-Aug.

24. *Trifolium pratense* L. Red Clover. Fig. 2679.

Trifolium pratense L. *Sp. Pl.* 768. 1753.

Perennial, the stems decumbent or erect, branching, 2-6 dm. long, sparsely villous-pubescent with spreading hairs. Stipules of upper leaves ovate, subulate-tipped, strongly veined; leaflets oval to obovate, 2-5 cm. long, obtuse, pubescent, often with a large dark spot near the middle; heads globose or broadly ovoid, 2-3 cm. broad, subtended by 1 or 2 leaves; flowers sessile; calyx 5-8 mm. long, the teeth a little longer than the tube, villous; corolla red, about twice the length of the calyx.

Native of Europe and north Asia, widely cultivated in the Pacific States, growing spontaneously in fields and meadows, especially in the Humid Transition and Canadian Zones. April-Nov.

25. *Trifolium arvense* L. Rabbit-foot Clover. Fig. 2680.

Trifolium arvense L. *Sp. Pl.* 769. 1753.

Annual, silky-pubescent, the stems erect, freely branching, 15-45 cm. high. Leaves short-petioled; stipules narrow, subulate-tipped, entire or nearly so; leaflets linear or oblanceolate, denticulate above, obtuse and often emarginate, 12-25 mm. long; heads terminal, oblong, 12-25 mm. long, dense; flowers sessile; calyx 5-6 mm. long, the teeth plumose, much longer than the tube and the pale pink or white corolla.

In fields and waste places, introduced from Europe; sparingly established in Washington and Oregon. June-Aug.

26. *Trifolium incarnatum* L. Crimson, French, or Italian Clover. Fig. 2681.

Trifolium incarnatum L. *Sp. Pl.* 769. 1753.

Annual, villous-pubescent throughout, the stems mostly simple, erect, 4-8 dm. high. Lower leaves long-petioled; stipules broad, membranous, entire or dentate; leaflets obovate or obcordate, 15-25 mm. long; heads terminal, oblong, 3-6 cm. long; flowers sessile; calyx villous, about 1 cm. long, the subulate teeth exceeding the tube; corolla crimson, equaling or exceeding the calyx.

Native of Europe, sparingly naturalized in the Pacific States. May-Aug.

27. *Trifolium Macraei* Hook. & Arn. McCrae's or Double-headed Clover. Fig. 2682.

Trifolium Macraei Hook. & Arn. *Bot. Misc.* 3: 179. 1833.

Annual, soft-pubescent, the stems several from the base, decumbent or spreading, 1-3 dm. long, often stout. Lower leaves long-pedicelled, those subtending the heads very short-petioled; leaflets obovate or oblanceolate, obtuse or retuse, 8-12 mm. long; heads sessile, usually in pairs in the axils of the uppermost leaves, short-ovoid, 8-12 mm. high; calyx-teeth subulate, plumose; corolla purple, 5-6 mm. long, equaling or somewhat exceeding the calyx.

Open grassy places, along the coast, mainly Transition Zone; Del Norte County to San Luis Obispo County, California; also in Chile. Type locality: sandy hills, near Valparaiso, Chile. March-May.

28. *Trifolium amoënum* Greene. Showy Indian Clover. Fig. 2683.*Trifolium amoënum* Greene, Fl. Fran. 27. 1891.

Annual, more or less densely pubescent, the stems stout, erect, 1–6 dm. high, usually simple below, and dichotomously branched above. Leaves nearly sessile; stipules with an elongated subulate tip; leaflets broadly obovate, about 25 mm. long, entire or obscurely denticulate; peduncles 3–10 cm. long, straight; heads short-ovoid, 2–3 cm. long, dense; calyx about 10–12 mm. long, the teeth longer than the tube; corolla purple, tipped with white, 15 mm. long, exceeding the calyx-teeth.

Open grassy valleys and low hills, Upper Sonoran Zone; a rare species of the North Coast Ranges of California, in Solano, Sonoma, and Marin Counties. Type locality: Vanden Station, Sacramento Valley, California. April–June.

29. *Trifolium dichotomum* Hook. & Arn. Branched Indian Clover. Fig. 2684.*Trifolium dichotomum* Hook. & Arn. Bot. Beechey 330. 1836–38.*Trifolium dichotomum* var. *turbinatum* Jepson, Fl. W. Mid. Calif. 306. 1901.*Trifolium californicum* Jepson ex McDermott, N. Amer. Trifol. 215. pl. 87. 1910.

Annual, sparsely to densely pubescent, the stems erect or ascending; 15–40 cm. high. Leaves slender-petioled; stipules broadly lanceolate, abruptly acuminate; leaflets 8–20 mm. long, cuneate-obovate to elliptical; peduncles 5–15 cm. long, more or less recurved at apex; heads ovoid-cylindrical, 12–25 mm. long; calyx 7–8 mm. long, the teeth twice as long as the tube; corolla 10 mm. long, exceeding the calyx-teeth, purple, tipped with creamy white; pods 1-seeded.

Usually in rocky or gravelly soils, Upper Sonoran Zone; California Coast Ranges from Humboldt County to Santa Clara County. Type locality: "California." March–May.

Trifolium petrophilum Heller, Muhlenbergia 2: 298. 1907. Closely related and probably not specifically distinct from *T. dichotomum*, distinguished chiefly by the densely silky-pubescent leaves and stem and by the densely villous calyx, the pubescence completely obscuring the ribs of the calyx-tube. Inner Coast Ranges of central California. Type locality: Mount St. Helena, Napa County, California. March–May.

30. *Trifolium albopurpureum* Torr. & Gray. Common Indian or Rancheria Clover. Fig. 2685.*Trifolium albopurpureum* Torr. & Gray, Fl. N. Amer. 1: 313. 1838.*Trifolium Macraei* var. *albopurpureum* Greene, Fl. Fran. 26. 1891.

Annual, villous-pubescent, the stems slender, ascending, or somewhat decumbent, 1–4 dm. high. Stipules ovate-lanceolate, entire; leaflets 1–2 cm. long, cuneate-oblong, obtuse, denticulate above the middle; heads long-peduncled, ovoid, 8–15 mm. long; flowers sessile, not becoming reflexed; calyx villous; corolla purple, 6–7 mm. long, scarcely equaling the calyx; pod glabrous or sparsely hairy at apex, 1-seeded.

Open grassy hills and valleys, Upper Sonoran and Transition Zones; western British Columbia to southern California. Type locality: California (Douglas). March–June.

Trifolium albopurpureum var. *neolagopus* (Loja) McDermott, N. Amer. Trifol. 209. 1910. (*Trifolium neolagopus* Loja, Nuov. Giorn. Bot. Ital. 15: 194. 1883.) More rigidly erect than the typical species, calyx densely villous with long spreading hairs, the teeth three times as long as the tube; corolla 7–8 mm. long, equaling or slightly exceeding the calyx-teeth, purple, often tipped with white; pod distinctly hairy at apex. Grassy plains and foothills, Sacramento Valley and Sierra Nevada foothills to southern California. Type locality: near Chico, California.

31. *Trifolium columbinum* Greene. Dove Clover. Fig. 2686.*Trifolium columbinum* Greene, Pittonia 1: 4. 1887.*Trifolium olivaceum* var. *columbinum* Jepson, Man. Fl. Pl. Calif. 546. 1925.

Annual, the stem and leaves pubescent with upwardly appressed or ascending hairs, slender, 1–3 dm. high. Stipules lanceolate, acuminate, all but the uppermost leaves long-petioled; heads pedunculate, broadly conical, 15–20 mm. long; calyx densely plumose giving the head a dove color, 8–9 mm. long, the tube scarcely over 1 mm. long; corolla only half as long as the calyx, and completely concealed by it; ovary pubescent.

Grassy hills, Upper Sonoran Zone; foothills of the northern Sierra Nevada and the North Coast Ranges, California. Type locality: near Vacaville, California. March–May.

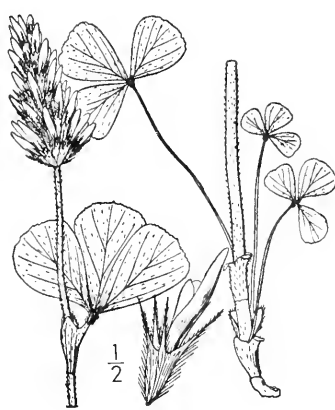
32. *Trifolium olivaceum* Greene. Olive Clover. Fig. 2687.*Trifolium olivaceum* Greene, Pittonia 1: 4. 1887.

Annual, villous-pubescent and glaucous, the stems erect or ascending, 2–3 dm. high. Leaves long-petioled; stipules abruptly aristate, entire; leaflets cuneate-obovate, 2–3 cm. long, serrulate; heads on short peduncles, broadly ovoid, 12–20 mm. long, bright olive-green; calyx with short villous ascending hairs, about 8 mm. long; corolla scarcely half the length of the calyx, purple with paler tips; pods glabrous, 1-seeded.

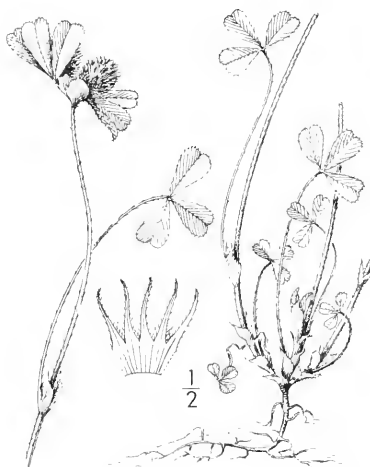
Open grassy hillsides, Upper Sonoran Zone; North Coast Ranges and the Upper Sacramento Valley, California. Type locality: near Vacaville, California. April–May.

33. *Trifolium cyathiferum* Lindl. Bowl Clover. Fig. 2688.*Trifolium cyathiferum* Lindl. Bot. Reg. 13: under pl. 1070. 1827.

Annual, glabrous, the stems erect or ascending, 1–3 dm. high. Stipules ovate to lanceolate,



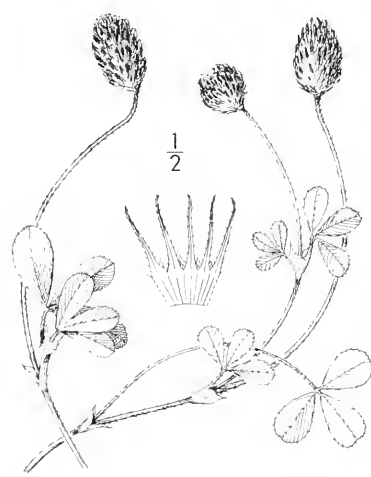
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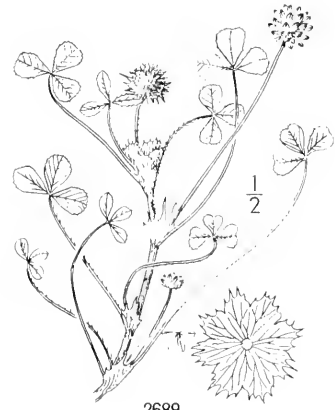
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2681. *Trifolium incarnatum*
2682. *Trifolium Macraei*
2683. *Trifolium amoenum*

2684. *Trifolium dichotomum*
2685. *Trifolium albopurpureum*
2686. *Trifolium columbinum*

2687. *Trifolium olivaceum*
2688. *Trifolium cyathiferum*
2689. *Trifolium barbigerum*

laciniately toothed; leaflets 10–25 mm. long, obovate to elliptic-oblong, obtuse or acute; involucre broad, bowl-shaped, membranous, nerved and toothed; calyx-teeth 1–3 times trichotomously-forked, equaling the rose-colored corolla; pod 2-seeded.

Valleys and hillsides, Arid Transition Zone; British Columbia and Idaho to northern California. Type locality: Columbia River. May–June.

34. *Trifolium barbigerum* Torr. Bearded Clover. Fig. 2689.

Trifolium barbigerum Torr. Pacif. R. Rep. 4: 79. 1856.

Annual, pubescent to glabrate, the stems several, rather stout, procumbent or decumbent, radiating from the base, 1–2 dm. long. Stipules broadly ovate, scarious, laciniate; leaflets 6–8 mm. long, deltoid or obcordate to ovate-oblong, setate-serrulate; peduncles slender, involucre as broad as the head and almost enclosing it, shortly lobed and setaceous many-toothed; calyx-tube short, membranous; teeth setaceous awned, plumose, the lower one sometimes 2–3-parted and equaling or exceeding the corolla; corolla dark purple, about 5 mm. long.

Open hillsides near the coast, mainly Humid Transition Zone; Del Norte County to Monterey County, California. Type locality: near San Francisco, California. April–June.

35. *Trifolium Grayi* Lola. Gray's Clover. Fig. 2690.

Trifolium barbigerum var. *Andrewsii* A. Gray, Proc. Amer. Acad. 7: 335. 1867.

Trifolium Grayi Loja, Nuov. Giorn. Bot. Ital. 15: 189. 1883.

Trifolium lilacinum Greene, Proc. Acad. Phila. 1895: 547. 1896.

Trifolium Andrewsii Heller, Muhlenbergia 1: 114. 1905.

Annual, more or less pilose throughout, the stem branched at the base and ascending, somewhat fistulose, 2–4 dm. long. Stipules large, 15–20 mm. long, laciniate; leaflets narrowly obovate, 12–20 mm. long; peduncles elongated, 15–20 cm. long; heads 20–25 mm. broad; involucre shallowly bowl-shaped, the lobes laciniate; calyx much shorter than the corolla, the upper tooth 3-parted; corolla 10–12 mm. long, deep purple and often white-tipped.

Wet meadows near the coast, Mendocino County to Monterey County, California. Type locality: not designated. April–June.

36. *Trifolium microdon* Hook. & Arn. Valparaiso Clover. Fig. 2691.

Trifolium microdon Hook. & Arn. Bot. Misc. 3: 180. 1833.

Annual, glabrous, the stems erect. 1–6 dm. high, the branches slender. Stipules ovate-lanceolate, abruptly acuminate, entire or few-toothed; leaflets broadly obcordate to oblanceolate, 1–2 cm. long; involucre deeply campanulate, glabrous and scarious below, 5–15-lobed, the lobes several-toothed, green; heads 6–7 mm. broad; calyx 4–5 mm. long, the teeth very short, triangular, abruptly apiculate, scarious and ciliate on the margin; corolla exceeding the calyx; 5–6 mm. long, pale rose or white; pod 1-seeded.

Open hillsides and valleys, in rich soils, Transition and Upper Sonoran Zones; British Columbia to San Luis Obispo County, California; also Chile. Type locality: Valparaiso, Chile. March–June.

Trifolium microdon var. *pilosum* Eastw. Proc. Calif. Acad. III. 1: 100. 1898. Distinguished from the typical form by the more or less pilose peduncles and involucre. Apparently the common form from British Columbia to northwestern California, and occurring sparingly along the coast to San Nicolas Island, southern California, which is the type locality.

37. *Trifolium microcephalum* Pursh. Small-headed Clover. Fig. 2692.

Trifolium microcephalum Pursh, Fl. Amer. Sept. 2: 478. 1814.

Annual, sparingly villous, the stems branched from the base, the branches ascending or procumbent, 2–4 dm. long. Stipules ovate, acuminate; leaflets 5–15 mm. long, obcordate or cuneate-obovate, emarginate, serrate; involucre lobes 7–10, lanceolate, with scarious web-like margins; heads small, 5–10 mm. long; calyx pubescent, 4 mm. long, the teeth subulate, about equaling the tube; corolla rose to white, 6 mm. long; pod 1–2-seeded.

Open grassy hillsides and valleys, Transition and Upper Sonoran Zones; British Columbia and Montana to Lower California and Nevada. Type locality: Bitter Root River, Montana, near the mouth of the Lolo. April–Aug.

38. *Trifolium monanthum* A. Gray. Carpet Clover. Fig. 2693.

Trifolium monanthum A. Gray, Proc. Amer. Acad. 6: 523. 1865.

Dwarf caespitose perennial from a taproot, 2–10 cm. high, sparsely villous-pubescent throughout. Stipules lanceolate, entire or nearly so; petioles filiform, elongated; leaflets cuneate-obovate, 2–8 mm. long, rounded to acutish at apex; peduncles filiform; involucre small, 2–4-parted, the lobes entire or toothed, 2–3 mm. long; flowers 1–3, 10–12 mm. long, cream-colored with purple-tipped keel; pod 1–3-seeded.

Alpine meadows and stream banks, Boreal Zone; Sierra Nevada, California, and western Nevada. Type locality: Soda Springs, Tuolumne River, altitude 8,700 feet, California. June–Aug.

Trifolium monanthum var. *parvum* (Kellogg) McDermott, N. Amer. Trifol. 105. 1910. Distinguished by its taller (10–30 cm.), less matted stems; leaves often 6–10 mm. long, obtuse; heads 3–6-flowered; flowers 6–8 mm. long. Grassy slopes, mainly Arid Transition Zone; Sierra Nevada, California, and western Nevada.

Trifolium monanthum var. *tenerum* (Eastw.) Parish, Bot. Gaz. 38: 461. 1904. In habit much like the preceding variety, but more villous; leaflets oblanceolate, acute, setose-serrate; involucre divided to the base, flowers 1–6, 10–12 mm. long. Mountain meadows, Arid Transition and Canadian Zones; southern Sierra Nevada to the San Jacinto Mountains, southern California.

39. *Trifolium fimbriatum* Lindl. Coast or Cow Clover. Fig. 2694.

Trifolium involucreatum Ortega, Hort. Matr. Dec. 33. 1800. Not Lamarck, 1793.

Trifolium fimbriatum Lindl. Bot. Reg. 13: pl. 1070. 1827.

Trifolium heterodon Torr. & Gray, Fl. N. Amer. 1: 318. 1838.

Perennial with slender creeping rootstocks, glabrous throughout, the stems branching from the base, decumbent, and usually rather stout, 1–4 dm. long. Stipules lanceolate, laciniately toothed; petioles 2–6 cm. long; leaflets obovate to oblanceolate, 10–25 mm. long, obtuse or acute, finely setose-serrulate, dark green; peduncles 3–6 cm. long, stout; involucre about 15 mm. broad, deeply lobed, the lobes laciniately toothed; heads many-flowered, 20–30 mm. broad; calyx 8–9 mm. long, 10-nerved, the aristate-subulate teeth slightly exceeding the tube; corolla about 12 mm. long, the standard broad, rounded and deeply emarginate at apex, white or light purple, the wings and keel dark reddish purple; ovules 2–6.

Low moist ground, especially in somewhat saline soils, near the coast, Upper Sonoran and Transition Zones; southern British Columbia to California. Type locality: near the Columbia River. May–Oct. This species has been referred to *T. Wormskjoldii* Lehm. which is said to have come from Greenland and is of doubtful determination.

40. *Trifolium spinulosum* Dougl. Mountain Clover. Fig. 2695.

Trifolium spinulosum Dougl. ex Hook. Fl. Bor. Amer. 1: 133. 1830.

Plants glabrous and pallid green throughout, the stems decumbent at base, 10–30 cm. long. Stipules lanceolate, acuminate, lacinate; leaflets oblanceolate, 15–35 mm. long, acute and mucronulate at apex, conspicuously spinulose-serrulate, prominently veined beneath; involucre shallowly and irregularly lobed, the lobes with usually 2 or 3 elongated subulate teeth; calyx-teeth aristate-subulate, longer than the tube; corolla about 12 mm. long, the standard white, wings and keel purple.

Mountain streams and wet meadows, mainly Canadian Zone; British Columbia and Montana south to Colorado and southern California, common in the Cascade Mountains and Sierra Nevada. Type locality: "Springs in the valleys between Spokane and Kettle Falls." June–Aug.

41. *Trifolium appendiculatum* Loja. Long-keeled Clover. Fig. 2696.

Trifolium appendiculatum Loja, Nuov. Giorn. Bot. Ital. 15: 181. 1883.

Annual, glabrous, the stems erect or decumbent, 1–4 dm. long, somewhat fistulous or slender. Stipules spreading, irregularly lacinate; leaflets obovate, 6–12 mm. long; involucre 7–8-lobed, the lobes with 3–5 lacinate teeth; heads 1–2 cm. broad; calyx 6 mm. long, the teeth exceeding the tube; corolla 8–10 mm. long, purple, cream-tipped; keel with a long-apiculate beak.

Grassy slopes near the coast, Humid Transition Zone; Humboldt County, to Monterey, not common. Type locality: "Coast fields," the definite locality not known. May–June.

42. *Trifolium oliganthum* Steudel. Few-flowered Clover. Fig. 2697.

Trifolium pauciflorum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 319. 1838. Not Urv. 1822.

Trifolium oliganthum Steudel, Nom. ed. 2: 707. 1841.

Trifolium filipes Greene, Pittonia 1: 66. 1887.

Annual, light green and glabrous, or nearly so, the stems 1–4 dm. high, erect, slender, sparsely leafy with long internodes. Stipules narrow, acuminate, few-toothed; leaflets 1–2 cm. long, linear to cuneate-oblong, acute, setate-serrate to entire; peduncles slender, 3–10 cm. long; involucre flat, small, the divisions deeply lacinate; heads 3–15-flowered, 5–7 mm. high; calyx 10-nerved, 4–5 mm. long, the teeth scarcely equaling the tube, sometimes with small lateral teeth; corolla little exceeding the calyx, lavender, white-tipped, the keel purple; pod 2–3-seeded.

Open woods, mainly Transition Zone; British Columbia to central California. Type locality: near the mouth of the Willamette River, Oregon. April–June.

43. *Trifolium trichocalyx* Heller. Monterey Clover. Fig. 2698.

Trifolium trichocalyx Heller, Muhlenbergia 1: 55. 1904.

Trifolium oliganthum var. *trichocalyx* McDermott, N. Amer. Trifol. 84. 1910.

Annual with much branched, prostrate or decumbent stems, 4–30 cm. long, slender, glabrous below, more or less pilose above. Stipules foliaceous, 4–6 mm. long, lacinate, leaflets obovate-cuneate, 4–10 mm. long, truncate or retuse at apex, spinulose-denticulate, sparsely pilose; involucre small, deeply lacinate-toothed; calyx 7 mm. long, conspicuously pilose with spreading white hairs, the teeth lanceolate-acuminate, exceeding the tube; corolla scarcely equaling the calyx-teeth, pale purple.

Sandy pine forests, Humid Transition Zone; Monterey Peninsula, California. Type locality: sandy pine woods about Pacific Grove, California. April–June.

44. *Trifolium melananthum* Hook. & Arn. Dark-headed Clover. Fig. 2699.

Trifolium melananthum Hook. & Arn. Bot. Beechey 331. 1836–38.

Trifolium variegatum var. *melananthum* Greene, Fl. Fran. 29. 1891.

Trifolium variegatum var. *major* Loja, Nuov. Giorn. Bot. Ital. 15: 183. 1883.

Stems often 2–4 dm. long. Leaflets oblanceolate to narrowly obovate, those of the middle part of the stem 15–25 mm. long, finely serrulate; peduncles 3–6 cm. long; heads many-flowered, calyx-lobes dark purple, subulate, longer than the tube; corolla 8–9 mm. long, dark purple, the standard tipped with white, rounded at the apex.

Moist heavy soil, Transition and Upper Sonoran Zones; Willamette Valley, Oregon, to southern California, most abundant in the valleys and foothills of the California Coast Ranges. Type locality: California. April–June.

Trifolium trilobatum Jepson, Bull. Torrey Club 18: 322. 1891. (*T. calophyllum* Greene, *T. phaecephalum* Greene). Probably only a color form of *T. melananthum* Hook. & Arn. from which it is best distinguished by the yellow-tipped or lilac-tipped petals. Foothills of the Sierra Nevada from Siskiyou County to Kern County, California.

45. *Trifolium polyodon* Greene. Monterey Clover. Fig. 2700.

Trifolium polyodon Greene, Pittonia 3: 215. 1897.

Annual, glabrous, the stems 3-4 dm. long, nearly prostrate. Leaves, at least the lower, long-petioled, stipules lacinate with reflexed margins; leaflets 1-2 cm. long, obovate, serrulate; involucre shallowly lobed, each lobe many-toothed; heads 8-15 mm. broad; calyx-tube turbinate, 10-nerved, the teeth 3- to several-toothed; corolla 8-10 mm. long, purple, the tips lighter fading to white; pods 2-seeded.

Moist places, Humid Transition Zone; Monterey Peninsula, California. May-June.

46. *Trifolium variegatum* Nutt. White-tipped Clover. Fig. 2701.

Trifolium variegatum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 317. 1838.

Annual, glabrous, the stems usually several from the base, decumbent or ascending, 2-6 dm. long. Stipules ovate, laciniately toothed; leaflets variable, those of the lower leaves small, mostly cuneate, obcordate, those of the upper obovate or oblong-lanceolate, 5-15 mm. long, setose-serrulate; peduncles slender, exceeding the leaves; heads obliquely subglobose, 6-12 mm. broad; involucre lobed and laciniately toothed, narrower than the heads; calyx-teeth subulate-setaceous, longer than the tube, simple or one tooth bifid; corolla purple, white-tipped, 6-8 mm. long; pod 2-seeded.

Moist places, Transition and Upper Sonoran Zones; British Columbia to southern California. Type locality: springy places near the mouth of the Willamette River, Oregon. May-July. A variable species of which the following is one of the extreme forms.

Trifolium geminiflorum Greene, Pittonia 3: 216. 1897 (*T. pusillum* Greene, *T. dianthum* Greene). Annual, glabrous, branches slender, 5-25 cm. long; leaflets obcordate to oblanceolate, 8-10 mm. long; peduncles almost filiform; involucre one- to few-lobed; heads small, usually 2-5-flowered; corolla about 6 mm. long, light purple with whitish tips. Mountain springs and streams, Transition and Canadian Zones; southern Oregon to southern California.

47. *Trifolium tridentatum* Lindl. Tomcat Clover. Fig. 2702.

Trifolium tridentatum Lindl. Bot. Reg. 13: under pl. 1070. 1827.

Trifolium segetum Greene, Pittonia 3: 221. 1897.

Trifolium trimorphum Greene, Pittonia 3: 220. 1897.

Annual, glabrous throughout, the stems erect, or somewhat decumbent, often branching from the base, 2-5 dm. high, more or less branched above. Lower stipules lanceolate-acuminate, entire, the upper shorter and lacinate; leaflets oblong-lanceolate to narrowly linear-lanceolate, 15-35 mm. long, more or less setaceous toothed; peduncles axillary, elongated; heads mostly 15-20 mm. broad; involucre a flat disk, unevenly lacinate, but not lobed; calyx-teeth dilated below, often with 2 small lateral teeth; the tube 10-nerved or sometimes with intervening nerves more or less developed below; corolla 10-12 mm. long, reddish purple, the wings with dark tips, the standard with pale or whitish tips.

Open grassy fields and slopes, Transition and Upper Sonoran Zones; Vancouver Island to southern California. Type locality: Columbia River. March-June.

Trifolium tridentatum var. *aciculare* (Nutt.) McDermott, N. Amer. Trifol. 26. 1910. (*Trifolium aciculare* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 319. 1838.) Distinguished from the narrow-leaved form of the typical species by the paler flowers, 20-25-nerved calyx-tube, and the usually entire teeth. This is the more common form of this polymorphic species in the Sacramento-San Joaquin Valley and in southern California. Type locality: Santa Barbara, California.

48. *Trifolium obtusiflorum* Hook. Creek or Clammy Clover. Fig. 2703.

Trifolium obtusiflorum Hook. Bot. Beechey 331. 1836-38.

Trifolium tridentatum var. *obtusiflorum* S. Wats. Proc. Amer. Acad. 11: 130. 1876.

Annual, soft-pubescent, clammy and acidulous, the stems 3-5 dm. high, stout and fistulous, erect with ascending branches. Stipules spreading or reflexed, conspicuously setulose; leaflets 2-3 cm. long, linear-lanceolate to broadly oblanceolate, pectinately setulose; peduncles 3-8 cm. long; involucre small, deeply lacinate with subulate divisions; heads 2-3 cm. broad; calyx-tube 20-nerved, the teeth entire, dilated near the base; corolla 12 mm. long, white or pale rose with a dark purple spot near the center.

Moist places, especially creek bottoms, Transition and Upper Sonoran Zones; southwestern Oregon to southern California. Type locality: near Monterey, California. April-July.

49. *Trifolium Gambellii* Nutt. Gambell's Sour Clover. Fig. 2704.

Trifolium Gambellii Nutt. Journ. Acad. Phila. II. 1: 151. 1848.

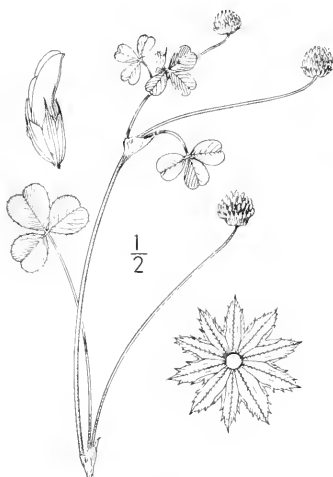
Trifolium fucatum var. *Gambellii* Jepson, Fl. W. Mid. Calif. 311. 1901.

Stems branching from the base, procumbent, stout and fistulous, 5-8 dm. long. Stipules large and scarious; leaflets entire or finely pectinate, rhombic, 15-40 mm. long; calyx-teeth much elongated, bristle-like and one or more of them 2-3-cleft; corolla white, tinged with yellow and purple, 15-20 mm. long, the standard inflated in age.

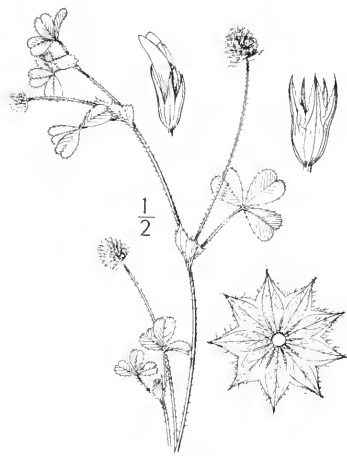
Moist places, Transition and Upper Sonoran Zones; locally distributed in Contra Costa, San Luis Obispo, Ventura, and Los Angeles Counties, California. Type locality: Santa Catalina Island. April-June.



2690



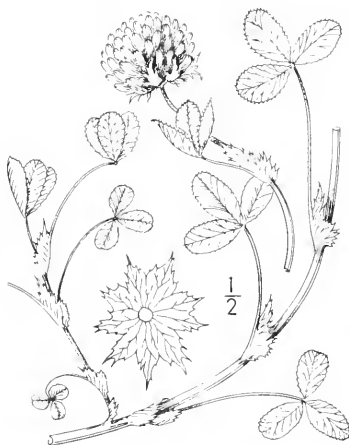
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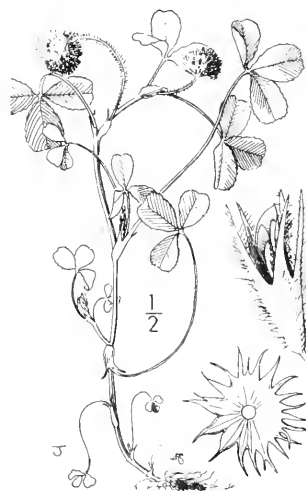
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2690. *Trifolium Grayi*2691. *Trifolium microdon*2692. *Trifolium microcephalum*2693. *Trifolium monanthum*2694. *Trifolium fimbriatum*2695. *Trifolium spinulosum*2696. *Trifolium appendiculatum*2697. *Trifolium oliganthum*2698. *Trifolium trichocalyx*

50. *Trifolium flavulum* Greene. Yellow Sour Clover. Fig. 2705.

Trifolium flavulum Greene, Pittonia 2: 223. 1892.

Trifolium virescens Greene, Pittonia 2: 223. 1892.

Trifolium fucatum var. *flavulum* Jepson, Fl. W. Mid. Calif. 310. 1901.

Pale green and glaucescent, the branches stout, prostrate, often 5–6 dm. long. Leaflets broadly obovate, 15–20 mm. long, finely denticulate or entire; heads 5–15-flowered; calyx-teeth subulate, the lower much exceeding the tube, corolla 10–15 mm. long, yellow tinged with purple or green.

Moist, heavy soil, Upper Sonoran and Transition Zones; Vancouver Island to southern California. Type locality: western California. April–June. The greenish-flowered form (*T. virescens*) is an upland plant with mostly ascending branches and smaller heads.

51. *Trifolium fucatum* Lindl. Sour Clover. Fig. 2706.

Trifolium fucatum Lindl. Bot. Reg. 22: pl. 1883. 1836.

Trifolium physopetalum Fisch. & Mey. Ind. Sem. Hort. Petrop. 3: 47. 1837.

Annual, glabrous, the stems stout, fistulous, diffuse, 2–8 dm. long. Stipules ovate, 15–20 mm. long, entire; leaflets broadly obovate, 10–30 mm. long, coarsely denticulate; peduncles stout, 3–15 cm. long; involucre lobes lanceolate, acuminate, 12–18 mm. long; heads large, 2.5–4 cm. in diameter; calyx scarious, the teeth shorter than the tube; corolla 20–25 mm. long, cream-colored, the keel dark purple; pod 3–8-seeded, stipitate.

Moist places, Transition and Upper Sonoran Zones; northern California in the Coast Ranges, the Great Valley, and the Sierra Nevada foothills to southern California. Type locality: California. April–June.

52. *Trifolium amplexens* Torr. & Gray. Pale Sack Clover. Fig. 2707.

Trifolium amplexens Torr. & Gray, Fl. N. Amer. 1: 319. 1838.

Trifolium depauperatum var. *amplexens* McDermott, N. Amer. Trifol. 142. 1910.

Trifolium truncatum Greene, Proc. Acad. Phila. 1895: 546. 1896.

Annual, light green, the branches slender, decumbent, 10–25 cm. long. Stipules entire; leaflets cuneate-obovate or oblong, 1–2 cm. long, rounded to retuse, serrulate; involucre lobes 3–4 mm. long, and about as broad, scarious-margined, entire or with one or two teeth; calyx-tube very short, the upper teeth short, the lower exceeding the tube; corolla 6 mm. long, ochroleucous, the standard much inflated in age; pod 4–6-seeded.

Grassy hillsides and valleys, Upper Sonoran Zone; chiefly in the Coast Ranges of central California. Type locality: California. April–June.

53. *Trifolium stenophyllum* Nutt. Narrow-leaved Sack Clover. Fig. 2708.

Trifolium stenophyllum Nutt. Journ. Acad. Phila. II. 1: 151. 1848.

Trifolium diversifolium Nutt. op. cit. 152.

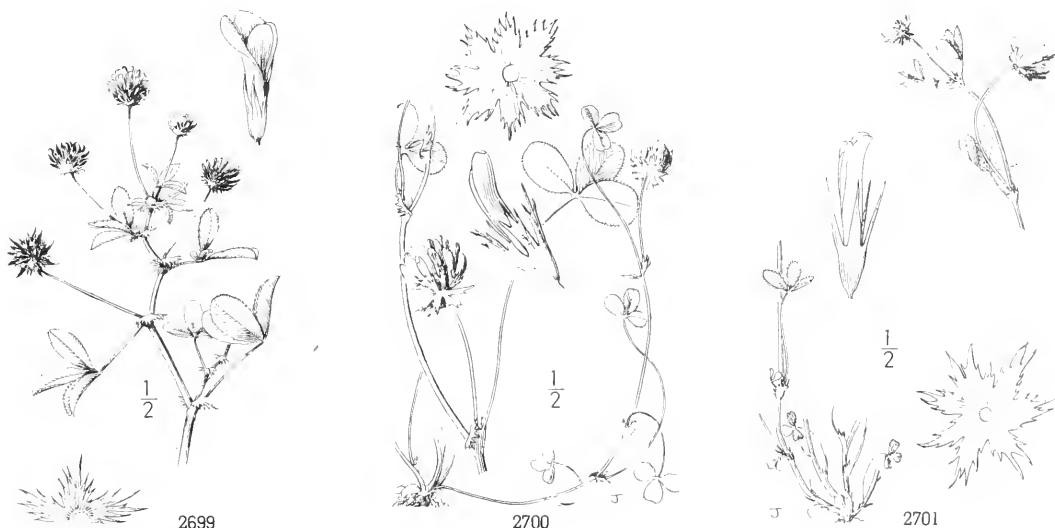
Trifolium franciscanum Greene, Man. Bay Reg. 100. 1894.

Trifolium anodon Greene, Pittonia 5: 107. 1903.

Trifolium brachydon Greene, Pittonia 5: 107. 1903.

Trifolium amplexens var. *stenophyllum* Jepson, Man. Fl. Pl. Calif. 537. 1925.

Annual, glabrous, the branches decumbent or ascending, 1–2 dm. long. Stipules entire; leaflets 1–2 cm. long, narrowly cuneate-oblong to linear, acute to truncate and retuse at apex, denticulate; peduncles very slender, well exceeding the leaves; involucre bracts green, or with a narrow scarious margin, oblong, entire, 2–4 mm. long; calyx-tube very short, the upper teeth



2699. *Trifolium melananthum*

2700. *Trifolium polyodon*

2701. *Trifolium variegatum*

shorter than the tube, the lower exceeding it; corolla red-purple, 5-6 mm. long, standard much inflated in age.

Grassy hillsides and plains, Upper Sonoran Zone; California, Butte County and the North Coast Ranges to San Diego. Type locality: Santa Catalina Island. March-May.

54. *Trifolium depauperatum* Desv. Dwarf Sack Clover. Fig. 2709.

Trifolium depauperatum Desv. Journ. Bot. 4: 69. 1814.

Dwarf, annual, the branches decumbent, 5-10 cm. long. Leaflets 1-2 cm. long, cuneate-oblong, obtuse or retuse, denticulate; peduncles elongated, very slender; heads small, few-flowered; involucre reduced to a mere ring; calyx-tube very short, the teeth decidedly unequal; corolla red-purple, 7-9 mm. long, inflated in age; pod 1-2-seeded.

Moist clay or adobe soil, Upper Sonoran Zone; Humboldt County, and north Sacramento Valley to central California; also in Chile. Type locality: "western coasts of both North and South America." April-May.

Trifolium fragiferum L. Sp. Pl. 772. 1753. Perennial, stems prostrate. Leaves rather long-petioled; leaflets obovate, 10-15 mm. long, glabrous; peduncles 6-9 cm. long, slightly exceeding the leaves; heads round-ovoid, 12-14 mm. long in flower; flowers pink; calyces inflated and reflexed in fruit and heads becoming 20 mm. long. Locally established in moist meadows in eastern Washington (Grandview) and eastern Oregon (Hermiston). Native of Europe.

9. *HOSACKIA* Dougl. ex Benth. Bot. Reg. 15: pl. 1257. 1829.

Perennial or annual herbs with pinnately 1- to several-foliolate leaves. Stipules scarious, rarely herbaceous or reduced to a gland. Flowers axillary, umbellate or solitary, sessile or on short often bracteate peduncles, yellow or reddish. Calyx-teeth 5, nearly equal, keel incurved, blunt to acute or rarely beaked. Stamens diadelphous, free from the petals. Ovary sessile; ovules 1 to several. Pod linear, nearly terete or compressed, 2-valved or indehiscent. [Name in honor of David Hosack, 1769-1835, professor of botany, Columbia College.]

A North American genus of about 50 species, all but two of which are restricted to western North America. Type species, *Hosackia bicolor* Dougl.

Stipules membranous or herbaceous.

I. EUHOSACKIA.

Stipules reduced to a usually black gland.

Pods dehiscent, abruptly short-beaked, straight or nearly so.

Keel not prolonged into an incurved beak (*H. parviflora* excepted); pods not reflexed.

II. ANISOLOTUS.

Keel prolonged into an incurved beak; leaflets 3, the terminal petiolulate, the 2 lateral sessile and borne at the base of the leaf; pod reflexed.

III. ACMISPON.

Pods indehiscent, tapering to an elongated beak, often arcuate and reflexed.

IV. SYRMATUM.

Subgenus I. EUHOSACKIA.

Pods linear-oblong, 3-5 mm. wide; bracts distant from the umbel or sometimes subtending it in *incana*, usually 3-5-pinnate.

Plants hoary with a dense silky-villous pubescence; calyx-teeth subulate, 2-3 mm. long.

1. *H. incana*.

Plants green, glabrate or more or less pubescent, calyx-teeth triangular, 1-1.5 mm. long.

Stipules herbaceous, auriculate.

2. *H. stipularis*.

Stipules membranaceous, ovate to lanceolate, not auriculate, glabrate or sparsely pubescent.

Leaflets oblong-obovate, bright green above, pale beneath; standard purple, wings yellow, or the petals and calyx all rose-purple.

3. *H. rosea*.

Leaflets broadly obovate, light glaucous green on both surfaces; petals greenish yellow, the standard tinged or veined with purple.

4. *H. crassifolia*.

Pods linear, less than 3 mm. wide; bracts 1-3-foliolate, subtending the umbel, rarely wanting.

Plants glabrous or nearly so; claws of petals well exerted, those of the keel longer than the blades.

Bracts usually none; flowers yellow and white.

5. *H. pinnata*.

Bracts present, 1-3-foliolate; standard yellow, wings rose-colored, keel purple at tip.

6. *H. gracilis*.

Plants pubescent or glabrous; claws of petals scarcely exerted beyond the calyx, those of the keel shorter than the blades.

Plants more or less pubescent, erect or ascending; flowers mostly over 10 mm. long.

Leaflets obovate or oblong-ovate, or the uppermost narrower; standard yellow, wings and keel white.

7. *H. Torreyi*.

Leaflets oblong to linear, acute at both ends; petals yellow, tinged with purple in age.

8. *H. oblongifolia*.

Plants glabrous, prostrate; flowers 1-3 in the umbel, 5-7 mm. long.

9. *H. cuprea*.

Subgenus II. ANISOLOTUS.

Perennials; standard attenuate into the short claw; stigma subtended by a band of hairs.

Leaf-rachis elongated, 2-5 cm. long.

Stems strigose.

10. *H. grandiflora*.

Stems villous, with spreading hairs.

11. *H. leucophaca*.

Leaf-rachis short, 1 cm. long or less.

Plants erect, broom-like; peduncles stout, 6-12 cm. long; seeds granulose.

12. *H. rigida*.

Plants prostrate to ascending, the internodes short; peduncles slender, 0.5-4 cm. long; seeds smooth.

Leaflets canescent, strigose, linear-oblong.

13. *H. Wrightii multicaulis*.

Leaflets silvery with a dense silky pubescence, cuneate-obovate.

14. *H. argyrea*.

Annuals.

Keel blunt, not beaked.

Styles hairy at the base of the stigma; pods strigose; seeds not smooth.

Seeds quadrate, rugose and tuberculate or granulose.

15. *H. strigosa*.

Seeds subglobose, granulose but not rugose.

16. *H. tomentella*.

Styles glabrous; seeds smooth.

Flowers pedunculate; seeds ovoid or rounded, the sides turgid.

Corolla 7-8 mm. long; keel shorter than the other petals.

17. *H. maritima*.

Corolla 4-5 mm. long; keel longer than the other petals.

18. *H. humilis*.

Flowers subsessile; seeds irregularly flattened toward the edges, with a raised knob-like center on one or both sides.

Corolla cream-colored, tinged with reddish purple; plants erect, more or less glabrate.

19. *H. denticulata*.

Corolla yellow, tinged with reddish purple; plants prostrate or decumbent.

Pods 10-15 mm. long; calyx-lobes about equaling the tube.

20. *H. subpinnata*.

Pods 5-10 mm. long; calyx-lobes twice as long as the tube.

21. *H. brachycarpa*.

Keel acutely beaked; leaf-rachis not dilated; flowers solitary, cream-colored and reddish or pink.

22. *H. parviflora*.

Subgenus III. ACMISPON.

Flowers white or pinkish, solitary in the axils on a slender 1-bracted peduncle.

23. *H. americana*.

Subgenus IV. SYRMATIUM.

Body of the pod little exerted beyond the calyx, often arcuate or the beak recurved; leaflets commonly 5 (3-5).

Stems at least when young villous-tomentose with spreading hairs.

24. *H. tomentosa*.

Stems strigose or silvery-silky-pubescent.

Plants glabrous or more or less canescent but not densely silvery-silky.

Calyx-teeth triangular-subulate, scarcely 1 mm. long; leaflets glabrous or sparsely strigose.

25. *H. juncea*.

Calyx-teeth narrowly subulate, 2-3 mm. long, villous.

Corolla 10-12 mm. long; calyx-lobes as long as the tube; leaflets loosely villous-tomentose.

26. *H. decumbens*.

Corolla 7-8 mm. long; calyx-lobes half the length of the tube; leaflets with short appressed curved hairs.

27. *H. nevadensis*.

Plants densely silvery-silky throughout.

Flowers 7-8 mm. long; claw of the standard much shorter than the blade.

Blade of the standard reflexed or at right angles to the broad claw.

28. *H. sulphurea*.

Blade of the standard only slightly ascending; claw slender.

29. *H. argophylla*.

Flowers 10-12 mm. long; claw of the standard slender, equaling or exceeding the blade.

Calyx-teeth 2.5 mm. long; corolla well exceeding the calyx; umbels long-peduncled or sometimes subsessile.

30. *H. ornithopus*.

Calyx-teeth 3.5 mm. long; corolla little exceeding the calyx; umbels subsessile.

Stem and leaves with short closely appressed pubescence.

31. *H. Fremontii*.

Stem and leaves densely silvery-silky but the hairs longer and somewhat spreading.

32. *H. nivea*.

Body of the pod well exerted beyond the calyx, straight or somewhat curved.

Annuals; pods long and slender, more or less constricted between the seeds.

Umbels on slender peduncles; flowers 5-7 mm. long.

33. *H. prostrata*.

Umbels sessile or subsessile; flowers 3-4.5 mm. long.

34. *H. micrantha*.

Perennials.

Umbels peduncled, usually bractless, but bearing 1 or more black glands at the apex of the peduncle.

Flowers several in the umbel.

Calyx-lobes subulate-setaceous, weak and often recurved; plants mostly prostrate, not shrubby.

35. *H. cystoides*.

Calyx-lobes short and stiffly erect, triangular to triangular-subulate.

36. *H. dendroidea*.

Flowers solitary or rarely 2.

37. *H. Haydonii*.

Umbels sessile; calyx-lobes subulate.

Plants green and glabrous or sparsely strigose.

38. *H. glabra*.

Plants pallid and silvery-silky.

39. *H. sericea*.

1. *Hosackia incana* Torr. Woolly *Hosackia*. Fig. 2710.

Hosackia incana Torr. Pacif. R. Rep. 4: 79. pl. 4. 1857.

Lotus incanus Greene, Pittonia 2: 147. 1890.

Perennial, erect, 15-45 cm. high, canescent with a dense short villous or almost silky tomentum. Leaflets 5-15, usually 7 or 9, elliptic to obovate, 7-15 mm. long; stipules ovate, scarious; peduncles 1.5-3 cm. long, scarcely equaling the leaves; bract closely subtending the umbel or often distant, commonly 3-foliate and petiolulate, stipulate; umbels few- to many-flowered; calyx-tube cylindric, the teeth subulate, scarcely half the length of the tube; corolla about 15 mm. long, the claws exerted beyond the calyx; claw of the standard remote from the others; wings longer than the obtuse keel; pods 15-40 mm. long, 3-4 mm. broad; seeds ovoid, smooth, mottled.

Open coniferous forests, Arid Transition Zone; western slopes of the Sierra Nevada, from Butte County to Placer County, California. Type locality: dry hillsides, near South Yuba. May-June.

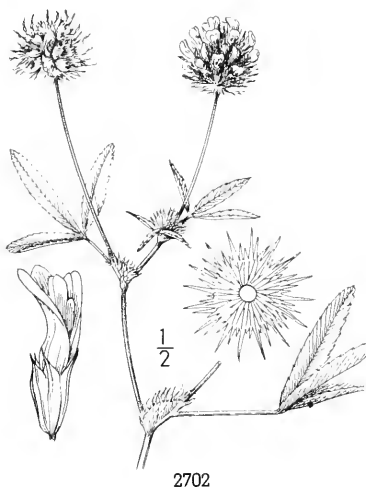
2. *Hosackia stipularis* Benth. Stipulate *Hosackia*. Fig. 2711.

Hosackia stipularis Benth. Trans. Linn. Soc. 17: 365. 1837.

Hosackia macrophylla Kell. Proc. Calif. Acad. 2: 123. 1861.

Lotus stipularis Greene, Pittonia 2: 147. 1890.

Stems usually several from a perennial root, ascending or erect, simple or with a few



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2703



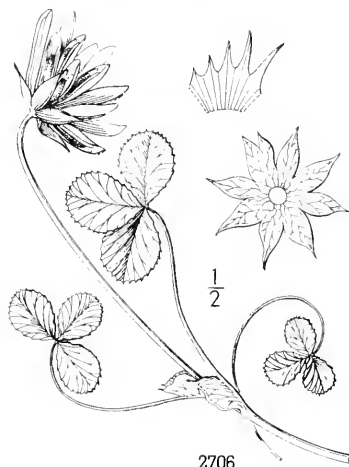
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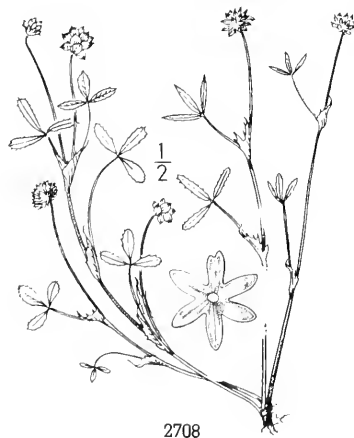
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2702. *Trifolium tridentatum*
2703. *Trifolium obtusiflorum*
2704. *Trifolium Gambellii*

2705. *Trifolium flavulum*
2706. *Trifolium fucatum*
2707. *Trifolium amplexens*

2703. *Trifolium stenophyllum*
2709. *Trifolium depauperatum*
2710. *Hosackia incana*

branches near the base, 2-5 dm. high, the whole plant villous-pubescent or the leaflets, especially the upper surface, glabrate. Leaflets 9-19, oblong-elliptic to ovate-oval, 1-2.5 mm. long, the lower pair basal; stipules herbaceous, lanceolate, auriculate at base, attenuate at apex; peduncles 3-6 cm. long; bract borne about the middle of the peduncle, 5-7-foliolate and stipulate, rarely wanting; umbels 5-10-flowered; pedicels slender. 2-3 mm. long; calyx-tube 4 mm. long; teeth subulate, 1.5-2 mm. long; petals 10-12 mm. long, standard and keel purple tipped with white, wings white; pod 2-3 cm. long, 2-3 mm. wide; seeds ovoid.

Wooded slopes, mainly Humid Transition Zone; Mendocino County to Monterey, California. Type locality: collected by Douglas, probably at Monterey. April-June.

Hosackia stipularis subsp. *balsamifera* (Kell.) Abrams. (*Hosackia balsamifera* Kell. Proc. Calif. Acad. 2: 123. 1861. *Lotus balsamiferus* Greene, Man. Bay Reg. 93. 1894.) Differs from the typical species in being resinous-glandular or viscid throughout, and balsam-scented. The North Coast Range form is villous and clothed with stalked glands, the Sierra Nevada form is viscid with sessile glands, and otherwise glabrous or merely pubescent. Open woods, mainly Transition Zone; Siskiyou County to Lake and Mariposa Counties, California. Type locality: no locality was given in the original description, nor on the type specimen.

3. *Hosackia ròsea* Eastw. Rose-flowered *Hosackia*. Fig. 2712.

Hosackia rosea Eastw. Proc. Calif. Acad. II. 6: 424. pl. 55. 1896.

Lotus stipularis var. *subglaber* Ottley, Univ. Calif. Pub. Bot. 10: 200. 1923.

Lotus aboriginus Jepson, Fl. Calif. 2: 315. 1936.

Stems prostrate to ascending, several from a perennial root, the whole plant glabrous or essentially so. Leaflets mostly 7 or 9, elliptic, 10-15 mm. long, the lowest pair remote from the base of the rachis; stipules membranous, triangular-lanceolate; peduncles 5-6 cm. long, equaling or exceeding the leaves; bract when present near the middle of the peduncle, unifoliate or reduced and membranous; calyx purple, 3.5 mm. long, the teeth short, triangular; corolla 8-10 mm. long, rose-colored; pods 15-35 mm. long, 3 mm. wide.

Open woods, Humid Transition Zone; Puget Sound, Washington, to Mendocino County, California. Type locality: along the road to Glen Blair near Fort Bragg, Mendocino County, California. May-July.

4. *Hosackia crassifolia* Benth. Broad-leaved *Hosackia*. Fig. 2713.

Hosackia crassifolia Benth. Trans. Linn. Soc. 17: 365. 1837.

Hosackia stolonifera Lindl. Bot. Reg. 23: pl. 1977. 1837.

Hosackia platycarpa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 323. 1838.

Hosackia stolonifera var. *pubescens* Torr. Pacif. R. Rep. 4: 79. 1857.

Lotus crassifolius Greene, Pittonia 2: 147. 1890.

Stems one to several from the perennial root, stout, 4-10 dm. high. Leaflets mostly 9-13, the lower pair distant from the base of the rachis, elliptic to cuneate-obovate, 10-25 mm. long, pale green, puberulent, with incurved hairs, glabrate in age; stipules membranous, triangular-lanceolate; peduncles 5-8 cm. long, shorter than the leaves; bracts usually present, remote from the umbel, 1-5-foliolate; flowers 8-15; pedicels 2-4 mm. long; calyx 4 mm. long, the teeth short, triangular; petals 8-10 mm. long, greenish yellow, marked with purple; pods 4-6 cm. long, 4-5 mm. wide.

Open dry situations, mainly Arid Transition Zone; Mason and Klickitat Counties, Washington, south to San Diego County, California. Type locality: California, collected by Douglas, probably in the Coast Ranges of central California. April-July.

5. *Hosackia pinnata* (Hook.) Abrams. Pinnate-leaved *Hosackia*. Fig. 2714.

Lotus pinnatus Hook. Bot. Mag. 56: pl. 2913. June, 1829.

Hosackia bicolor Dougl. ex Benth. Bot. Reg. 15: pl. 1257. Aug. 1829.

Lotus bicolor Frye & Rigg, Northwest Fl. 234. 1912.

Perennial from a thickened root, the stems usually ascending, simple, rather stout, 15-45 cm. high, minutely and very sparsely strigose, the plant otherwise glabrous. Leaflets 5, 7 or usually 9, obovate, 1-2 cm. long, petiolulate; stipules ovate, scarious; peduncles well exceeding the leaves, 5-10 cm. long, bractless except for some minute scarious involucre bracts; umbels several to many-flowered; calyx-tube 5 mm. long; teeth very unequal, the lower subulate, 2-3 mm. long, the upper much shorter; petals 12 mm. long with well exerted claws, standard and keel yellow, wings white; pods 4-6 cm. long, 2 mm. broad; seeds oblong.

Stream banks and wet meadows, Transition and Canadian Zones; Puget Sound, Washington, to northern Idaho and south to the central Sierra Nevada and Lake County, California. Type locality: between Fort Vancouver and the Grand Rapids of the Columbia. April-July.

6. *Hosackia grácilis* Benth. Slender or Coast *Hosackia*. Fig. 2715.

Hosackia gracilis Benth. Trans. Linn. Soc. 17: 365. 1837.

Lotus formosissimus Greene, Pittonia 2: 147. 1890.

Stems several from a perennial root, slender, decumbent, 10-45 mm. long, whole plant glabrous. Leaflets 5-9, elliptic to broadly obovate, 7-20 mm. long, the lowest pair of leaflets remote from the base of the rachis; stipules membranous, triangular-lanceolate; peduncles 4-8 cm. long, about equaling or exceeding the leaves; bract subtending the umbel, 3-5-foliolate; calyx-tube 3 mm. long; teeth subulate, about equal, 2 mm. long; corolla 12-14 mm. long, wings spreading, rose-colored, red tipped with purple; pod about 3 cm. long and 2 mm. wide; seed oblong.

Wet grassy places, mainly Humid Transition Zone; coastal region, Chehalis County, Washington, to Monterey County, California. Type locality: California, collected by Douglas, probably at Monterey. March-July.

7. *Hosackia Tórreyi* A. Gray. Torrey's Hosackia. Fig. 2716.

Hosackia Torreyi A. Gray, Proc. Amer. Acad. 8: 625. 1873.

Hosackia Torreyi var. *nevadensis* A. Gray, loc. cit.

Lotus oblongifolius var. *Torreyi* Ottley, Univ. Calif. Pub. Bot. 10: 205. 1923.

Stems 1 to several from a perennial root, 3–5 dm. high, whole plant more or less soft-pubescent to almost glabrous. Leaflets 9–11, oblong-ovate to narrowly obovate, obtuse or rounded at apex, or the uppermost narrower and acutish, 10–25 mm. long; stipules membranous, lanceolate; peduncles about equaling the leaves; bract 1–3-foliolate, closely subtending the few- to several-flowered umbel; calyx hirsute, the teeth subulate, nearly as long as the tube; petals 10–13 mm. long, standard yellow, wings and keel white; pods 3–6 cm. long, 2 mm. wide.

Moist places, Transition and Canadian Zones; Lane County, Oregon, to the southern Sierra Nevada and the North Coast Ranges, California. Type locality: from Clark's to Yosemite Valley, California. June–Oct.

8. *Hosackia oblongifolia* Benth. Narrow-leaved Hosackia. Fig. 2717.

Hosackia oblongifolia Benth. Pl. Hartw. 305. 1848.

Lotus oblongifolius Greene, Pittonia 2: 146. 1890.

Plants perennial by slender rootstocks, the stems one to several, erect or ascending 3–5 dm. high, whole plant appressed-pubescent to almost glabrous. Leaflets linear-lanceolate, acute at both ends; stipules membranous, lanceolate-acuminate; peduncles longer than the leaves; bract 1–3-foliolate, closely subtending the umbel; flowers 1–3, or rarely 5, in the umbel; calyx-teeth narrowly subulate, nearly equaling the tube; petals 10–12 mm. long, the blades much exceeding the short claws, yellow or the standard and occasionally the keel tinged with purple; pod 2.5–4 cm. long.

Wet places, Transition and Upper Sonoran Zones; Coast Ranges of central California and foothills of the Sierra Nevada to northern Lower California. Type locality: vicinity of Monterey. May–Oct.

Hosackia lathyroides Dur. & Hilg. Pacif. R. Rep. 5: 6. pl. 3. 1856. (*Hosackia oblongifolia* var. *angustifolia* S. Wats. Bot. Calif. 1: 135. 1876.) Leaflets linear or narrowly linear, umbels often only 1-flowered, otherwise closely resembling *H. oblongifolia* from which it is probably not specifically distinct. Originally collected at Fort Miller on the banks of the San Joaquin River, and ranging to southern California.

9. *Hosackia cùprea* (Greene) Smiley. Copper-flowered Hosackia. Fig. 2718.

Lotus cupreus Greene, Leaflets Bot. Obs. 1: 74. 1904.

Hosackia cuprea Smiley, Univ. Calif. Pub. Bot. 9: 257. 1921.

Lotus oblongifolius var. *cupreus* Ottley, Univ. Calif. Pub. Bot. 10: 206. 1923.

Perennial with slender rootstocks, the stems usually several, prostrate, 1–2 dm. long, whole plant glabrous or essentially so. Leaflets of the lowermost leaves 3, obovate-cuneate, those of the upper leaves usually 5, linear-lanceolate or oblanceolate, 7–15 mm. long, acute at both ends; peduncles filiform, shorter than the leaves; bract when present 1-foliolate, flowers 1 or 2; calyx glabrous, the teeth subulate; petals 5–7 mm. long, yellow, turning copper-colored in age.

Wet meadows, Canadian Zones; southern Sierra Nevada, California. Type locality: Hockett Meadows, altitude 8,600 feet, Tulare County. June–Aug.

10. *Hosackia grandiflora* Benth. Large-flowered Hosackia. Fig. 2719.

Hosackia grandiflora Benth. Trans. Linn. Soc. 17: 266. 1837.

Hosackia ochroleuca Nutt. in Torr. & Gray, Fl. N. Amer. 1: 323. 1838.

Hosackia macrantha Greene, Bull. Calif. Acad. 1: 81. 1885.

Lotus grandiflorus Greene, Pittonia 2: 145. 1890.

Anisolotus grandiflorus Heller, Muhlenbergia 8: 20. 1912.

Perennial from a deep-seated woody root, the stems simple or branched, erect, 2–7 dm. high, whole plant pubescent with upwardly appressed incurved hairs. Leaflets mostly 7 or 9, obovate to elliptical, 1–2 cm. long; peduncles 4–8 cm. long; bract 1-foliolate, subtending the umbel, sometimes absent; umbel two- to several-flowered; calyx-tube 5 mm. long about equaled by the subulate teeth; petals yellow, turning rose in age, about 2 cm. long, the claws included in the calyx; pods 3–4 cm. long, 2 mm. wide; seeds broadly and somewhat obliquely ovoid, about 2 mm. long, dark brown.

Open woods, Upper Sonoran Zone; western slopes of the Sierra Nevada and the Santa Ynez Mountains, Santa Barbara County, California. Type locality: California, collected by Douglas, probably in the vicinity of Santa Barbara. April–June. The Sierra plants, which represent *H. macrantha* Greene, have larger flowers than the Santa Barbara plants.

11. *Hosackia leucophaea* (Greene) Abrams. Pale Hosackia. Fig. 2720.

Hosackia grandiflora var. *anthylloides* A. Gray, Proc. Acad. Phila. 15: 350. 1863.

Lotus leucophacus Greene, Pittonia 2: 145. 1890.

Lotus grandiflorus var. *mutabilis* Ottley, Univ. Calif. Pub. Bot. 10: 208. 1923.

Closely related to *H. grandiflora*, and distinguished mainly by the more compact habit and shorter stems, which arise from slender widely branching rhizomes; whole plant pale glaucous green and more or less densely villous with spreading hairs.

Dry ridges, mainly Arid Transition Zone; Coast Ranges, California, from Mendocino County to the Cuyamaca Mountains, San Diego County. Type locality: Santa Lucia Mountains, Monterey County, California. April–Nov.

12. *Hosackia rígida* Benth. Rigid or Desert Hosackia. Fig. 2721.

Hosackia rigida Benth. Pl. Hartw. 305. 1848.

Lotus rigidus Greene, Pittonia 2: 142. 1890.

Lotus argensis Coville, Contr. U.S. Nat. Herb. 4: 83. 1893.

Anisolotus rigidus Rydb. Bull. Torrey Club 33: 144. 1906.

Anisolotus argensis Heller, Muhlenbergia 9: 67. 1913.

Stems several from a perennial root, usually branched below, erect or ascending, 3–5 dm. high, woody and broom-like, with long internodes. Leaflets 3–5, on a very short rachis, linear-oblong to oblong-ob lanceolate, 5–15 mm. long, strigose; peduncles stout, 6–12 cm. long; bract when present 1-foliolate, subtending the 1–3-flowered umbel; calyx-tube 5–6 mm. long, appressed-pubescent, the teeth subulate, nearly equaling the tube; corolla 15–25 mm. long, claws short, included; pods 3–4 cm. long, about 3 mm. wide; seeds nearly globose, finely granulose.

Rocky hillsides, Lower Sonoran Zone; desert regions extending from the Mojave and Colorado Deserts, California, to southern Utah, Arizona, and Lower California. Type locality: collected by Coulter, locality not known. March–May.

13. *Hosackia Wrightii* subsp. *multicaulis* (Ottley) Abrams. Wright's Hosackia. Fig. 2722.

Lotus Wrightii var. *multicaulis* Ottley, Univ. Calif. Pub. Bot. 10: 211. pl. 70. 1923.

Stems many, arising from a woody perennial root, decumbent or ascending, 1–2 dm. long, the internodes short, whole plant canescent with an appressed pubescence. Leaflets 3–5 on a very short, almost obsolete rachis, linear-oblong, 6–10 mm. long; peduncles slender; calyx-tube 4 mm. long; teeth subulate, 2 mm. long; corolla 8–10 mm. long, yellow, turning rose; pods 20–25 mm. long, 2–2.5 mm. wide; seeds nearly globose, smooth.

Rocky hillsides, Sonoran Zones; desert regions, mainly in the juniper belt, New York Mountains, Mojave Desert, California, to southern Nevada. Type locality: Barnwell, California. April–June. The typical species ranges from southern Utah and Colorado to New Mexico and Arizona.

14. *Hosackia argyraea* Greene. Silver Hosackia. Fig. 2723.

Hosackia argyraea Greene, Bull. Calif. Acad. 1: 184. 1885.

Lotus argyraeus Greene, Pittonia 2: 144. 1890.

Anisolotus argyraeus Heller, Muhlenbergia 8: 47. 1912.

Stems numerous from a stout woody root, prostrate, 1–3 dm. long, whole plant silvery with dense silky pubescence, internodes short. Leaflets 3–5, on a very short rachis, cuneate-obovate, 4–10 mm. long; peduncles 15–35 mm. long; bracts none; umbels 1–2-flowered or rarely 3–4-flowered; calyx-tube 2.5–3 mm. long, nearly equaled by the subulate teeth; corolla 7–10 mm. long; pod 10–15 mm. long, 2–3 mm. wide, strigose; seeds globose, smooth.

Dry slopes, Arid Transition Zone; San Bernardino Mountains, southern California, to northern Lower California. Type locality: Cantillas Mountains, Lower California. May–Aug.

15. *Hosackia strigosa* Nutt. Strigose Hosackia. Fig. 2724.

Hosackia strigosa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 326. 1838.

Hosackia nudiflora Nutt. loc. cit.

Lotus strigosus Greene, Pittonia 2: 141. 1890.

Annual, with numerous slender decumbent or ascending branches from the root crown, 1–2 dm. long, whole plant strigose. Stipules gland-like; leaf-rachis 5–15 mm. long; leaflets 3–9, mostly 5–7, oblong-ob lanceolate and acute to cuneate-obovate and rounded, retuse at apex, 5–10 mm. long; peduncle longer than the leaves; bracts in young plants none, in older, 1–3-foliolate, subtending the 1–3-flowered umbel; calyx-tube 2 mm. long, nearly equaled by the subulate teeth; corolla 8–10 mm. long, yellow turning rose-red; pods 2–3 cm. long, 2.5–3 mm. wide, strigose; seeds quadrate, and more or less rugulose and tuberculate.

Dry sandy or gravelly plains and hillsides, Upper Sonoran Zone; central California from the Bay Region and Tuolumne County south to northern Lower California. Type locality: Monterey, California. Feb.–June.

Hosackia strigosa var. *hirtella* (Greene) Hall, Univ. Calif. Pub. Bot. 4: 199. 1912. (*Lotus hirtellus* Greene, Pittonia 2: 142. 1890. *Lotus strigosus* var. *hirtellus* Ottley, Univ. Calif. Pub. Bot. 10: 215. 1923.) Distinguished from the typical species by the spreading hirsutulous pubescence; seeds granulose, and faintly or not at all rugose. Dry gravelly or sandy soils, Upper Sonoran and (mainly) Arid Transition Zones; central Sierra Nevada to the Cuyamaca Mountains, California. Type locality: ridge north of Hetch Hetchy, Sierra Nevada, California.

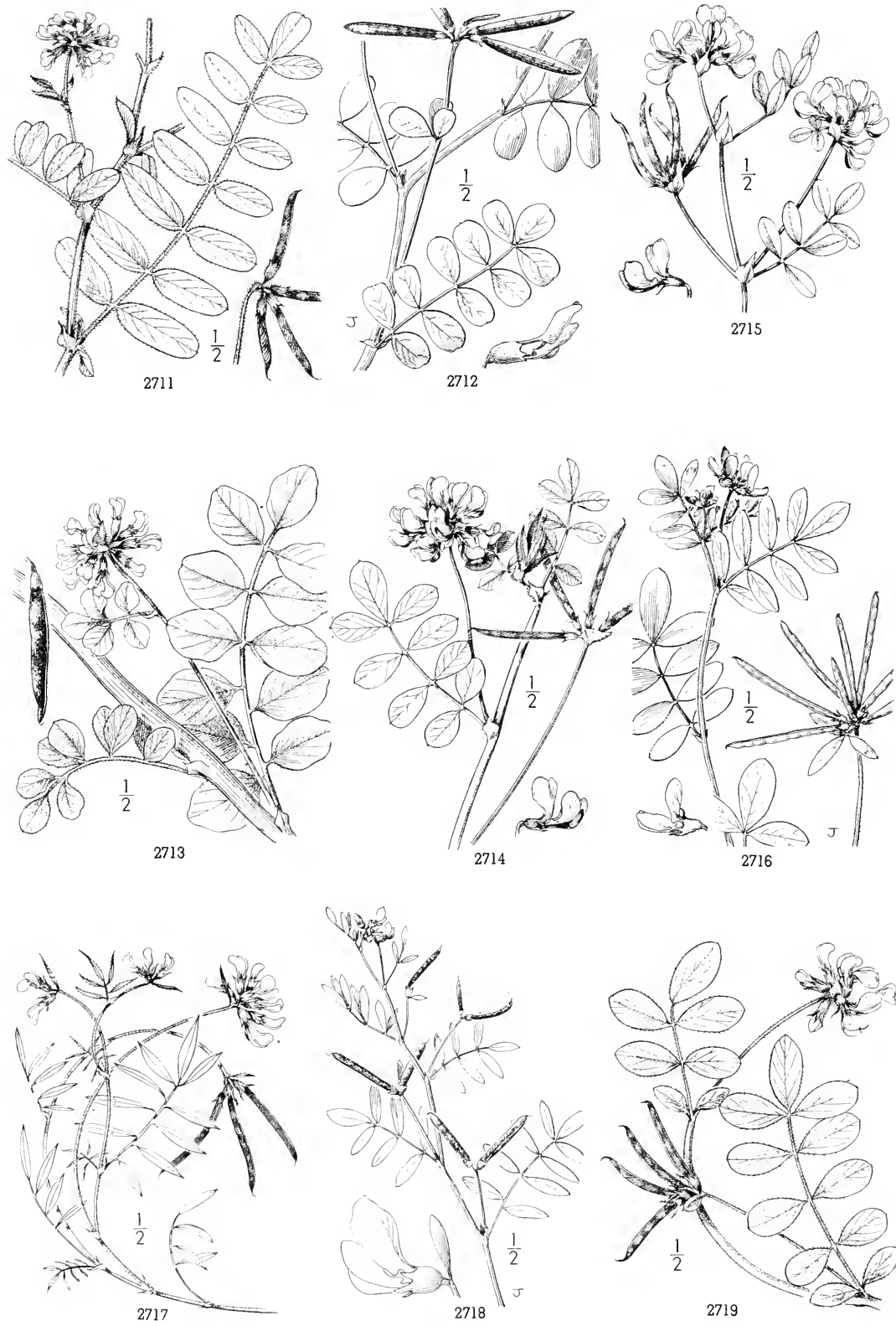
Hosackia rubella Nutt. in Torr. & Gray, Fl. N. Amer. 1: 326. 1838. (*Lotus rubellus* Greene, Pittonia 2: 141. 1890.) Perhaps only a small-flowered form (5–7 mm. long) of *Hosackia strigosa* Nutt. Coastal region, San Francisco to San Diego, California. Type locality: Monterey, California.

16. *Hosackia tomentella* (Greene) Abrams. Desert Hosackia. Fig. 2725.

Lotus tomentellus Greene, Pittonia 2: 140. 1890.

Annuals, the stems many from the root crown, prostrate, 5–15 cm. long, whole plant strigose; stipules gland-like; rachis of leaves 5–15 mm. long; leaflets 5–7, cuneate-obovate, 3–10 mm. long; peduncles about equaling the leaves, 1–2-flowered; calyx-tube 2–2.5 mm. long; teeth lanceolate, scarcely 2 mm. long; corolla about 5 mm. long, turning rose; pod 1–2 cm. long, 2–2.5 mm. wide; seeds globose to ovoid, finely granulose.

Dry sandy or gravelly soils, Lower Sonoran Zone; desert regions from the Panamint Mountains, California, to central Lower California and east to Arizona. Type locality: Los Angeles Bay, Lower California. Feb.–May.



2711. *Hosackia stipularis*
2712. *Hosackia rosea*
2713. *Hosackia crassifolia*

2714. *Hosackia pinnata*
2715. *Hosackia gracilis*
2716. *Hosackia Torreyi*

2717. *Hosackia oblongifolia*
2718. *Hosackia cuprea*
2719. *Hosackia grandiflora*

17. *Hosackia marítima* Nutt. Coastal Hosackia. Fig. 2726.

Hosackia marítima Nutt. in Torr. & Gray, Fl. N. Amer. 1: 326. 1838.

Lotus salsuginosus Greene, Pittonia 2: 140. 1890.

Anisolotus maritimus Heller, Muhlenbergia 8: 48. 1912.

Annual, the stems several from the root crown, prostrate or decumbent, 1–2 dm. long, whole plant somewhat succulent and sparsely strigose. Leaf-rachis 1–2 cm. long; leaflets 4–6, obovate, 5–15 mm. long; peduncles about equaling the leaves; bract 1-foliolate, broadly ovate; umbels 1–5-flowered; calyx-tube 3 mm. long; teeth 2 mm. long, broadly subulate; corolla 7–8 mm. long, the blades abruptly narrowed to the short claws; pods 15–30 mm. long, 2 mm. wide; seeds globose to obliquely ovoid, smooth.

Grassy slopes, mainly Upper Sonoran Zone; Santa Clara County, California, to northern Lower California. Type locality: Santa Barbara. March–July.

18. *Hosackia humilis* (Greene) Abrams. Humble Hosackia. Fig. 2727.

Lotus humilis Greene, Pittonia 2: 140. 1890.

Lotus salsuginosus var. *brevivexillus* Ottley, Univ. Calif. Pub. Bot. 10: 217. 1923.

Annual, the stems several, prostrate, 5–15 cm. long, whole plants very sparsely strigose or glabrate, somewhat succulent. Rachis of leaves 3–10 mm. long; leaflets 3–5, cuneate-obovate, 4–10 mm. long; peduncles 1–3-flowered, 5–20 mm. long; bract 1-foliolate, round-ovate; calyx-tube scarcely over 1 mm. long, longer than the subulate teeth; corolla 3–4 mm. long, the keel longer than the standard and wings; pods 10–15 mm. long, 2.5 mm. wide, distinctly constricted between the obliquely ovoid smooth seeds.

Desert regions, Lower Sonoran Zone; Panamint Mountains, California, to Arizona and Lower California. Type locality: San Bartolomé Bay, Lower California. Feb.–May.

19. *Hosackia denticulata* Drew. Toothed Hosackia. Fig. 2728.

Hosackia denticulata Drew, Bull. Torrey Club 16: 151. 1889.

Lotus denticulatus Greene, Pittonia 2: 139. 1890.

Anisolotus denticulatus Heller, Muhlenbergia 7: 139. 1912.

Annual, the stem erect, with a few stout ascending branches, 2–5 dm. high, glabrous or strigose. Leaf rachis 8–15 mm. long; leaflets 3 or 4, obliquely obovate, acute or obtuse, often denticulate, 5–15 mm. long, pilose; flowers subsessile; calyx pilose, the tube about 1 mm. long, the subulate teeth about twice as long; corolla 4 mm. long; blade of standard suborbicular, keel attenuately beaked; pod 1–2 cm. long, 3–4 mm. wide, appressed-pubescent; seeds asymmetric, notched at the hilum, with an elevation on one or both sides, smooth.

Grassy slopes, mainly in the Humid Transition Zone; British Columbia south, mostly west of the Cascade Mountains, to northern California. Type locality: along Mad River, near Jarnigan's, Humboldt County, California. May–July.

20. *Hosackia subpinnata* (Lag.) Torr. & Gray. Chile Hosackia. Fig. 2729.

Lotus subpinnatus Lag. Gen. & Sp. Pl. 23. 1816.

Lotus Wrangelianus Fisch. & Mey. Ind. Sem. Hort. Petrop. 41: 16. 1835.

Hosackia subpinnata Torr. & Gray, Fl. N. Amer. 1: 326. 1838.

Hosackia Wrangeliana Torr. & Gray, Fl. N. Amer. 1: 326. 1838.

Lotus subpinnatus var. *Wrangelianus* Jepson, Fl. W. Mid. Calif. 303. 1901.

Annual, the stems diffusely branched, decumbent, 5–20 cm. long, glabrate to strigose. Leaflets 3 or 5, narrowly to broadly obovate, entire, 5–15 mm. long, strigose or pilose; flowers subsessile; calyx 4 mm. long, the teeth about equaling the tube; corolla yellow, tinged reddish purple in age, 5–6 mm. long; keel attenuately beaked; pod 1–1.5 cm. long, 3 mm. wide, rather sparsely appressed-pubescent.

Grassy slopes, Upper Sonoran and Transition Zones; Humboldt County and western slopes of the Sierra Nevada, California, south to Lower California; also Chile. Type locality: Talcohuano, Chile. March–June.

21. *Hosackia brachycarpa* Benth. Short-podded Hosackia. Fig. 2730.

Hosackia brachycarpa Benth. Pl. Hartw. 306. 1848.

Lotus humistratus Greene, Pittonia 2: 139. 1890.

Lotus trispermus Greene, Erythea 1: 258. 1893.

Anisolotus brachycarpus Rydb. Bull. Torrey Club 33: 144. 1906.

Annual, with general habit of the preceding species, but whole plant densely villous. Calyxlobes about twice as long as the tube; pods densely villous, 5–10 mm. long, 2–5-seeded.

Dry gravelly or sandy ridges, mainly Sonoran Zones; Humboldt County and the Upper Sacramento Valley, California, to Lower California and New Mexico. Type locality: "In montibus, Sacramento." Collected by Hartweg. March–July.

22. *Hosackia parviflora* Benth. Small-flowered Hosackia. Fig. 2731.

Hosackia parviflora Benth. Bot. Reg. 15: under pl. 1257. 1829.

Lotus micranthus Benth. Trans. Linn. Soc. 17: 367. 1837.

Hosackia microphylla Nutt. in Torr. & Gray, Fl. N. Amer. 1: 326. 1838.

Anisolotus parviflorus Heller, Muhlenbergia 3: 100. 1907.

Annual, branching mostly from the base, the stems erect or ascending, slender, 1–3 dm. high, whole plant glabrous or very sparsely strigose. Leaf-rachis 3–10 mm. long; leaflets 3–5, oblong

to elliptical, 3–10 mm. long; peduncles usually longer than the leaves; bracts 3-foliate; umbels 1-flowered; calyx-tube 1 mm. long, longer than the subulate teeth; corolla 4–5 mm. long, cream-white, tinged with rose; pods 15–20 mm. long, 2 mm. wide, constricted between the seeds; seeds ovoid, smooth.

Grassy slopes, Transition and Upper Sonoran Zones; British Columbia south, west of the Cascade Mountains and Sierra Nevada, to southern California. Type locality: "North-west coast of America," collected by Douglas. April–June.

23. *Hosackia americana* (Nutt.) Piper. Spanish Clover. Fig. 2732.

Trigonella americana Nutt. Gen. 2: 120. 1818.

Hosackia Purshiana Benth. Bot. Reg. 15: under *pl.* 1257. 1829.

Lotus americanus Bisch. Del. Sem. Hort. Heidelb. 1839.

Hosackia americana Piper, Contr. U.S. Nat. Herb. 11: 366. 1906.

Annual, stems erect, branching, 2–6 dm. high, whole plant villous-pubescent or glabrate. Leaves 3-foliate, sessile or the lowest petioled; leaflets oblong-lanceolate to elliptical, 10–15 mm. long, the terminal petiolulate; peduncles 10–15 mm. long, slender; bract 1-foliate; flower solitary; calyx 3–4 mm. long, the subulate lobes twice as long as the tube; corolla white tinged with rose, 4–7 mm. long; pod 20–25 mm. long, deflexed, glabrous; seeds broadly oblong, black, smooth.

Open woods and grassy slopes, Upper Sonoran and Transition Zones; British Columbia to Dakota, south to northern Mexico and Lower California. Type locality: "On the banks of the Missouri." May–Oct.

A variable species, and several segregates have been proposed, the most extreme of which is a small-flowered (2–3 mm. long) form usually confined to the Arid Transition Zone.

24. *Hosackia tomentosa* Hook. & Arn. Woolly Hosackia. Fig. 2733.

Hosackia tomentosa Hook. & Arn. Bot. Beechey 137. 1832.

Syrmatium tomentosum Vogel, Linnaea 10: 591. 1836.

Lotus tomentosus Greene, Pittonia 2: 150. 1890.

Lotus criophorus Greene, Erythraea 1: 207. 1893.

Syrmatium criophorum Heller, Muhlenbergia 9: 67. 1913.

Perennial from a taproot, the branches numerous, slender, prostrate, forming a mat, leafy, villous-tomentose throughout. Leaflets 3–5, 5–12 mm. long, obovate to cuneate-oblong, more or less densely villous-tomentose; peduncles 2–8 mm. long; umbels 5- to many-flowered, bracteate; calyx densely villous, 4–5 mm. long, the teeth setaceous, equaling the tube; corolla 6 mm. long, yellow with red wings; pod 2-seeded, pubescent, 7–8 mm. long, the beak very slender, as long as the body, hooked.

Usually sandy soil near the coast, Transition and Sonoran Zones; Sonoma County, California, to northern Lower California. Type locality: Monterey, California. March–Oct.

Hosackia tomentosa subsp. *glabriuscula* (Hook. & Arn.) Abrams. (*Hosackia decumbens* var. *glabriuscula* Hook. & Arn. Bot. Beechey 137. 1832; *Hosackia Hcermannii* Dur. & Hilg. Journ. Acad. Phila. 11. 3: 39. 1855.) Villous when young but soon glabrous or nearly so; corolla 4–5 mm. long. Sandy soils, washes and embankments, Sonoran Zones; San Luis Obispo County, California, south to northern Lower California. Type locality: Tejon Pass, Tehachapi Mountains, California.

25. *Hosackia juncea* Benth. Rush Hosackia. Fig. 2734.

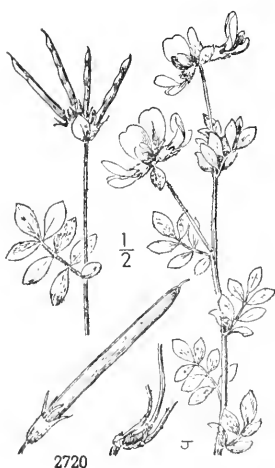
Hosackia juncea Benth. Trans. Linn. Soc. 17: 366. 1837.

Syrmatium junceum Greene, Bull. Calif. Acad. 2: 147. 1886.

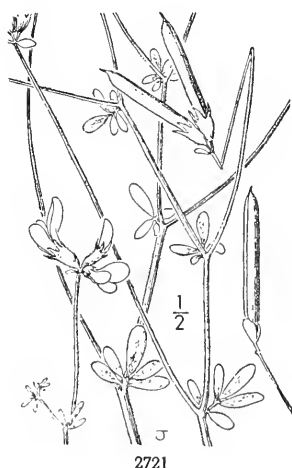
Lotus junceus Greene, Pittonia 2: 148. 1890.

Lotus Biolettii Greene, Pittonia 2: 222. 1890.

Perennial, the stems slender, numerous from the crown of a woody root, suffrutescent, much



2720. *Hosackia leucophaea*



2721. *Hosackia rigida*



2722. *Hosackia Wrightii*

branched, minutely strigose, but soon glabrous. Leaflets 3-5, glabrous or nearly so, narrowly oblong-ovate, rounded at apex, 5-10 mm. long; umbels 2-5-flowered, on slender peduncles, 6-20 mm. long, bractless; calyx-tube 3 mm. long, very sparsely strigose, the teeth triangular or triangular-subulate, scarcely 1 mm. long; corolla yellow tinged with red, the standard equaling the keel, the wings shorter; pod sparsely strigose, the body about twice as long as the calyx, 1-2-seeded, the beak slender, about equaling the body, strongly arcuate.

Sandy or rocky hillsides, near the coast, Upper Sonoran Zone; Mendocino County to San Luis Obispo County, California. Type locality: "California." April-July.

26. *Hosackia decumbens* Benth. Decumbent Hosackia. Fig. 2735.

Hosackia decumbens Benth. Bot. Reg. 15: under pl. 1257. 1829.

Syrmatium decumbens Greene, Bull. Calif. Acad. 2: 148. 1886.

Lotus Douglasii Greene, Pittonia 2: 149. 1890.

Lotus Leonis Eastw. Leaflets West. Bot. 2: 7. 1937.

Perennial, the branches arising from a woody crown, prostrate or decumbent, 2-5 dm. long, very slender, appressed-pubescent when young, becoming nearly glabrous in age, internodes elongated. Leaflets 3-5, oblanceolate to obovate, usually acute, 4-13 mm. long, villous-pubescent on both surfaces; umbels subsessile or short-peduncled, bracteate, with usually a 3-foliate bract, 10-12-flowered, calyx appressed-pubescent and especially the teeth villous, 2.5 mm. long, equaled by the subulate teeth; corolla 6-7 mm. long, the standard oblong, exceeding the keel; flowers light yellow; pod strongly arcuate, 10 mm. long, densely strigose, the body gradually tapering into the beak, 2-seeded.

Sandy or gravelly soils, Arid Transition Zone; Olympic Peninsula, Washington, and western Idaho, south to Siskiyou and Trinity Mountains, California. Type locality: northwest coast of America. May-Aug.

27. *Hosackia nevadensis* (S. Wats.) Parish. Sierra Nevada Hosackia. Fig. 2736.

Hosackia decumbens var. *nevadensis* S. Wats. Bot. Calif. 1: 138. 1876.

Syrmatium nevadense Greene, Bull. Calif. Acad. 2: 148. 1886.

Lotus nevadensis Greene, Pittonia 2: 148. 1890.

Hosackia nevadensis Parish, Plant World 20: 220. 1917.

Perennial from a slightly woody taproot, the branches slender, prostrate, 2-5 dm. long, minutely appressed-pubescent when young, becoming nearly glabrous in age, internodes elongated. Leaflets 3-5, obovate, mostly obtuse or rounded at the apex, 5-10 mm. long, villous-tomentose on both surfaces, the lower umbels on peduncles 10-25 cm. long, the upper often subsessile, bract 1-3-foliate; calyx 3 mm. long, tomentose, the teeth subulate, half the length of the tube; corolla 6 mm. long, yellow, often tinged with red, the standard scarcely exceeding the keel; pod strongly arcuate, 6 mm. long, the body shorter than the slender strongly curved beak, sparsely pubescent, 1-seeded.

Open pine forests, Arid Transition and Canadian Zones; northern Sierra Nevada south to the Laguna Mountains, San Diego, California. Type locality: "Carson City, Nevada," probably in the mountains to the west of Carson City. May-Aug.

28. *Hosackia sulphurea* (Greene) Abrams. Sulphur-flowered Hosackia. Fig. 2737.

Lotus sulphureus Greene, Pittonia 2: 293. 1892. Not Boiss.

Lotus Davidsonii Greene, Erythra 1: 207. 1893.

Syrmatium Davidsonii Heller, Muhlenbergia 9: 67. 1913.

Perennial, the branches numerous, arising from a short-branched woody crown, slender, prostrate, 2-5 dm. long, appressed-pubescent when young, becoming nearly glabrous in age, internodes 2-4 cm. long. Leaflets 3-5, canescent, with a tomentose-villous pubescence, 4-12 mm. long, narrowly to broadly obovate, obtuse or acutish at apex; the peduncles 3-12 mm. long; umbels 4-8-flowered, 1-bracted; calyx villous-tomentose, 3 mm. long, the teeth subulate, nearly as long as the tube; corolla sulphur yellow, fading red, the standard broadly obovate, erect, making a right angle to the wings; body of the pod short, about equaling the calyx, strongly arcuate, 1-seeded, exceeded by the slender curved beak.

Rocky ridges and open coniferous forests, Upper Sonoran and Arid Transition Zones; Mount Pinos, Ventura County, south to the San Bernardino Mountains, California. Type locality: Mount Wilson, Los Angeles County, California. April-July.

29. *Hosackia argophylla* A. Gray. Silver-leaved Hosackia. Fig. 2738.

Hosackia argophylla A. Gray, Pl. Thurb. 316. 1854.

Hosackia argentea Kell. Proc. Calif. Acad. 3: 38. 1863.

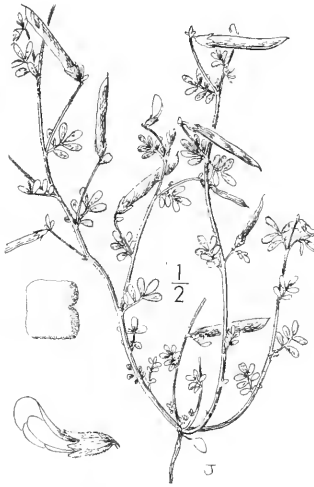
Syrmatium argophyllum Greene, Bull. Calif. Acad. 2: 147. 1886.

Lotus argophyllus Greene, Pittonia 2: 149. 1890.

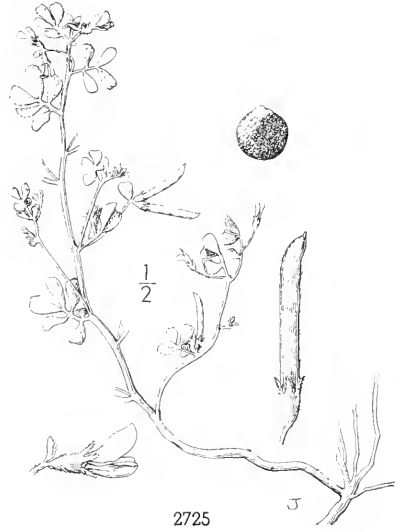
Perennial, woody at base, the branches numerous, slender, prostrate or decumbent, 2-5 dm. long, whole plant silvery with a dense, silky pubescence, internodes 15-30 mm. long. Leaflets 3-5, broadly oblanceolate to broadly obovate, 4-12 mm. long, rounded or obtuse at the apex; umbels sessile or subsessile, 1-bracted, 3-8-flowered; calyx 4 mm. long, the teeth subulate, half



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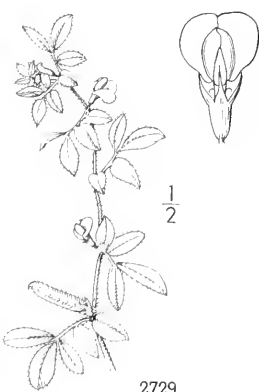
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2723. *Hosackia argyraea*
2724. *Hosackia strigosa*
2725. *Hosackia tomentella*

2726. *Hosackia maritima*
2727. *Hosackia humilis*
2728. *Hosackia denticulata*

2729. *Hosackia subpinnata*
2730. *Hosackia brachycarpa*
2731. *Hosackia parviflora*



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2732. *Hosackia americana*
2733. *Hosackia tomentosa*
2734. *Hosackia juncea*

2735. *Hosackia decumbens*
2736. *Hosackia nevadensis*
2737. *Hosackia sulphurea*

2738. *Hosackia argophylla*
2739. *Hosackia ornithopus*
2740. *Hosackia Fremontii*

as long as the tube; corolla yellow, 8 mm. long, the standard broadly oblong, ascending, longer than the claw; body of the pod short, little exceeding the calyx, arcuate, 1-seeded, the beak very slender, about as long as the body of the pod.

Rocky hillsides, Upper Sonoran Zone; southern Sierra Nevada, California, south to Lower California. Type locality: on rocks near San Isabel, San Diego County, California. April-July.

Hosackia argophylla var. *decòra* Johnston, Bull. S. Calif. Acad. 17: 63. 1918. Perennial, the branches arising from a prominent woody root, slender, prostrate, plant silvery-canescens with appressed pubescence throughout but less densely so than in the typical species; umbels usually about 10 mm. long; standard oblong, longer than the claw. Open pine forests and rocky ridges, mainly Arid Transition Zone; San Gabriel and San Bernardino Mountains, southern California.

30. *Hosackia ornithopus* Greene. Bird-claw *Hosackia*. Fig. 2739.

Hosackia ornithopus Greene, Bull. Calif. Acad. 1: 185. 1885.

Syrmatium ornithopum Greene, Bull. Calif. Acad. 2: 148. 1886.

Lotus ornithopus Greene, Pittonia 2: 149. 1890.

Lotus argophyllus var. *ornithopus* Ottley, Univ. Calif. Pub. Bot. 10: 238. 1923.

Perennial, branches numerous, decumbent, 2-5 dm. long, canescent with a close appressed pubescence, internodes 3-7 cm. long. Leaflets 5, oblanceolate to narrowly obovate, acute, 6-18 mm. long, silvery with an appressed villous tomentum; umbels capitate, many-flowered, 1-bracted, sessile or subsessile; calyx villous-tomentose, 5 mm. long, the teeth subulate equaling the tube; corolla 7-8 mm. long, the standard oblong-obovate; body of the pod well exerted beyond the calyx, curved, 2-seeded, attenuated into a slender beak of equal length.

Rocky ridges, Upper Sonoran Zone; Santa Catalina, San Clemente, Santa Barbara, and San Miguel Islands, southern California. Type locality: Guadalupe Island, Mexico. March-June.

Hosackia ornithopus subsp. *venusta* (Eastw.) Abrams. (*Hosackia venusta* Eastw. Proc. Calif. Acad. III. 1: 103. pl. 8. 1898.) Plants less densely pubescent, canescent rather than silvery, mostly prostrate; peduncles 1-4 cm. long. San Nicolas Island, the type locality, and on Santa Catalina, where it intergrades with the typical form.

31. *Hosackia Fremontii* (A. Gray) Abrams. Fremont's *Hosackia*. Fig. 2740.

Hosackia argophylla var. *Fremontii* A. Gray, Proc. Acad. Phila. 15: 347. 1863.

Syrmatium Fremontii Heller, Muhlenbergia 9: 67. 1913.

Lotus argophyllus var. *Fremontii* Ottley, Univ. Calif. Pub. Bot. 10: 237. pl. 81. 1923.

Perennial with decumbent branches 2-4 dm. long, silvery with an appressed silky pubescence. Leaflets 5, oblanceolate to obovate, acute, 5-12 mm. long, densely silky-pubescent; umbels capitate, densely flowered, sessile, and often approximate at the ends of the branches; calyx 7 mm. long, densely villous, the teeth exceeding the tube; corolla 8-9 mm. long, yellow turning red in age; standard broadly oblong, shorter than the slender claw; body of the pod short or about equaling the calyx, 1-seeded.

Rocky ridges, Upper Sonoran Zone; foothills on the western side of the Sierra Nevada, from Placer County to Mariposa County; also in Monterey County, California. Type locality: Sierra Nevada, California. April-June.

32. *Hosackia nivea* (Greene) S. Wats. Santa Cruz *Hosackia*. Fig. 2741.

Syrmatium nivum Greene, Bull. Calif. Acad. 2: 148. 1886.

Hosackia nivea S. Wats. Proc. Amer. Acad. 22: 470. 1887.

Lotus argophyllus var. *niveus* Ottley, Univ. Calif. Pub. Bot. 10: 237. 1923.

Perennial, silvery throughout with a dense silky pubescence, branches numerous, decumbent, rather stout, 3-5 dm. long. Leaflets 3-5, obovate or oblanceolate, acute or obtuse, 5-15 mm. long; umbels sessile or subsessile, capitate, several- to many-flowered, bractless; calyx densely villous-tomentose, 6-7 mm. long, the teeth subulate, longer than the tube; corolla 8 mm. long, but little exceeding the calyx-teeth; standard obovate; body of the pod little or not at all exerted beyond the calyx.

On rocky ridges, Upper Sonoran Zone; Santa Cruz Island, southern California. Type locality: Santa Cruz Island. May-July.

33. *Hosackia prostrata* Nutt. Prostrate *Hosackia*. Fig. 2742.

Hosackia prostrata Nutt. in Torr. & Gray, Fl. N. Amer. 1: 325. 1838.

Syrmatium prostratum Greene, Bull. Calif. Acad. 2: 147. 1886.

Lotus Nuttallianus Greene, Pittonia 2: 150. 1890.

Annual or short-lived perennial, from a taproot, the branches numerous, slender, prostrate, strigose when young, 3-8 dm. long. Leaflets 3-5, oblong-obovate, 3-10 mm. long, sparsely strigose or glabrous; peduncles very slender, 5-25 mm. long; umbels 1-bracted, or sometimes bractless, 1-9-flowered; calyx scarcely 2 mm. long, glabrous or sparsely strigose, the teeth triangular, 0.5 mm. long; corolla yellow, tips of the standard and wing often red; pod 2-seeded, usually constricted between the seeds, beak very slender, shorter than the body.

Gravelly or sandy soils near the coast, Lower Sonoran Zone; Del Mar, San Diego County, California, south to adjacent Lower California. Type locality: "Plains near the sea, St. Diego and St. Barbara, California." March-Sept.

34. *Hosackia micrantha* Nutt. San Diego *Hosackia*. Fig. 2743.

Hosackia micrantha Nutt. in Torr. & Gray, Fl. N. Amer. 1: 325. 1838.

Syrmatium micranthus Greene, Bull. Calif. Acad. 2: 147. 1886.

Lotus hamatus Greene, Pittonia 2: 150. 1890.

Annual, branching from the base, the branches very slender, prostrate, 15-60 cm. long, spar-

ingly pubescent when young, sparsely leafy. Leaflets 3-6, cuneate-oblong, 4-10 mm. long, sparsely pubescent; umbels sessile or subsessile, bractless, 3-9-flowered; calyx 2 mm. long, sparsely pubescent, the teeth subulate, much shorter than the tube; corolla 3.5 cm. long, yellow or pinkish, the standard shorter than the keel; pod strigose, the body curved, constricted between the two seeds, tipped by an elongated beak, hooked at the apex; seeds terete, slender, 2.5-3 mm. long.

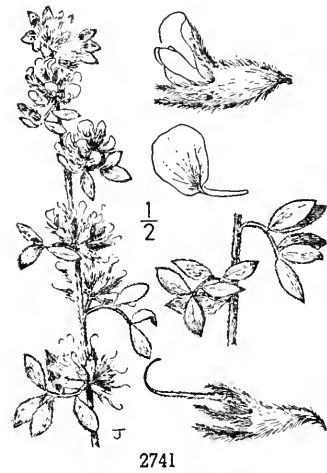
Dry hillsides and plains, Sonoran Zone; cismontane region of southern California to northern Lower California. Type locality: originally collected by Nuttall, probably at San Diego, but erroneously reported as Monterey. March-June.

35. *Hosackia cystoides* Benth. Bentham's *Hosackia*. Fig. 2744.

Hosackia cystoides Benth. Trans. Linn. Soc. 17: 366. 1837.
Syrmatium cystoides Greene, Bull. Calif. Acad. 2: 147. 1886.
Lotus Benthamii Greene, Pittonia 2: 148. 1890.

Perennial, the branches suffruticose, decumbent or suberect, 3-6 dm. long, strigose when young but soon glabrous. Leaflets 3, on a very short rachis, oblong-lanceolate to obovate, rounded or obtuse at apex, 4-10 mm. long, sparsely strigose or glabrous, stipular glands prominent; umbels 3-7-flowered, on slender peduncles 10-25 mm. long; calyx 6 mm. long, glabrous or nearly so, the teeth subulate, usually recurved, scarcely half as long as the tube; corolla 7-8 mm. long, yellow tinged with red; body of the pod slightly curved, longer than the calyx, glabrous, 2-3-seeded, gradually tapering to the slender beak.

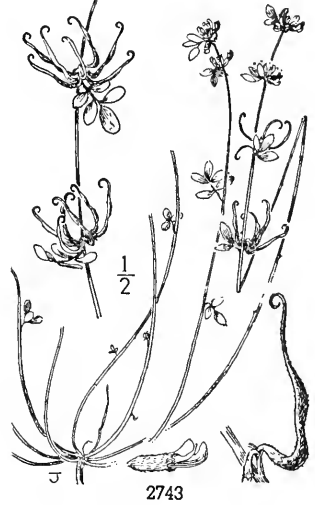
Sandy or gravelly soils, Humid Transition and Upper Sonoran Zones; hills and bluffs near the coast, Sonoma County to Monterey County, California. Type locality: California, probably Monterey. March-July.



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2741. *Hosackia nivea*
 2742. *Hosackia prostrata*

2743. *Hosackia micrantha*
 2744. *Hosackia cystoides*

2745. *Hosackia dendroidea*
 2746. *Hosackia Haydonii*

36. *Hosackia dendroidea* (Greene) Abrams. Island Broom. Fig. 2745.

Syrmatium dendroideum Greene, Bull. Calif. Acad. 2: 146. 1886.

Lotus dendroideus Greene, Pittonia 2: 148. 1890.

Syrmatium Traskiae Eastw. ex Abrams, Fl. Los Ang. 201. 1917.

Suffrutescent or shrubby, 3–10 dm. high, the branches sparsely strigose, soon glabrous, the older ones roughened by the prominent stipular glands. Leaves 3-foliolate, the rachis slender, 5–10 mm. long; leaflets 5–15 mm. long, linear-oblong, obtuse at apex, thinly strigose; umbels 3–9-flowered, bractless; peduncles 2–5 mm. long; calyx strigose, the teeth triangular-subulate, scarcely 1 mm. long; corolla 8 mm. long, yellow or tinged with red; pod nearly straight, glabrous, the body 10 mm. long, 2-seeded, the beak scarcely as long as the body, only the slender tip recurved.

Dry rocky ridges and canyon slopes, Upper Sonoran Zone; Santa Rosa, Santa Cruz, Anacapa, and Santa Catalina Islands, California. Type locality: Santa Cruz Island. March–June.

37. *Hosackia Haydonii* Orcutt. Haydon's *Hosackia*. Fig. 2746.

Hosackia Haydonii Orcutt, W. Amer. Sci. 6: 63. 1889.

Lotus Haydonii Greene, Pittonia 2: 149. 1890.

Erect much branched perennial, 3–4 dm. high, the branches very slender, rather rigid, green, sparsely strigose, especially on the nascent parts. Leaflets 3, elliptic, 2–3 mm. long; flowers solitary or rarely in pairs, 4–5 mm. long, borne on a short bractless peduncle; calyx strigose, 2.5 mm. long, teeth shorter than the tube; pod curved, 5 mm. long, sparsely strigose, 1-seeded.

Rocky desert slopes, Sonoran Zones; stony slopes of the Cuyamaca Mountains, California, and adjacent Lower California. Type locality: Colorado Desert canyons. March–May.

38. *Hosackia glabra* (Vogel) Torr. California Broom or Deer Weed. Fig. 2747.

Syrmatium glabrum Vogel, Linnaea 10: 591. 1836.

Hosackia scoparia Nutt. in Torr. & Gray, Fl. N. Amer. 1: 325. 1838.

Hosackia crassifolia Nutt. in Torr. & Gray, Fl. N. Amer. 1: 325. 1838.

Hosackia glabra Torr. Bot. Wilkes Exp. 274. 1873.

Lotus globosus Greene, Pittonia 2: 148. 1890.

Suffrutescent, the branches numerous, suberect or sometimes more spreading, 3–10 dm. high, soon glabrous, and broom-like. Leaflets 3, on a short rachis, linear or linear-oblong, obtuse or acuminate, glabrous or very sparsely strigose, umbels sessile in the axils, 1–4-flowered; calyx sparsely strigose or glabrous, the teeth subulate, about half the length of the tube; corolla yellow, sometimes tinged with red, 7–9 mm. long, the wings equaling or slightly exceeding the keel; body of the pod slender, much longer than the calyx, curved, glabrous, tapering to the subulate beak, 2-seeded.

Hillsides, Upper Sonoran Zone; Mendocino and Plumas Counties, California, south to northern Lower California. Type locality: California. March–Sept.

Hosackia glabra subsp. *brevialata* (Ottley) Abrams. (*Lotus scoparius* var. *brevialatus* Ottley, Univ. Calif. Pub. Bot. 10: 229. pl. 77. 1923.) Resembles slender forms of the typical species in general habit; wings of the corolla much shorter than the keel. Desert slopes and interior foothills of cismontane southern California, from southern San Bernardino County to northern Lower California.

39. *Hosackia sericea* Benth. Silky California Broom. Fig. 2748.

Hosackia sericea Benth. Trans. Linn. Soc. 17: 367. 1837.

Hosackia procumbens Greene, Bull. Calif. Acad. 1: 83. 1884.

Syrmatium sericeum Greene, Bull. Calif. Acad. 2: 147. 1886.

Syrmatium procumbens Greene, Bull. Calif. Acad. 2: 148. 1886.

Lotus procumbens Greene, Pittonia 2: 148. 1890.

Lotus leucophyllus Greene, Pittonia 2: 149. 1890.

Perennial, the stems several to many from the crown of a woody taproot, ascending or decumbent, 3–8 dm. long, strigose-canescens, sparsely so in age and pallid green. Leaflets 3 on a very short rachis, oblanceolate to linear-oblanceolate, 5–12 mm. long, acute at apex, silky-canescens; umbels sessile or subsessile, scattered along the branches, 1–3-flowered or rarely 6-flowered; calyx-tube silky, 3 mm. long, the teeth scarcely 1 mm. long, triangular-subulate; corolla yellow, 6–7 mm. long, the claws exerted beyond the calyx, the wings longer than the keel; pods reflexed, much exceeding the calyx, straight or falcate, 2- to several-seeded.

Sandy flats and dry hillsides, Upper Sonoran Zone; Inner Coast Ranges, San Benito and Monterey Counties to the desert slopes of the San Bernardino Mountains, California. Type locality: California. April–July.

Hosackia sericea subsp. *Jepsonii* (Ottley) Abrams. (*Lotus leucophyllus* var. *Jepsonii* Ottley, Univ. Calif. Pub. Bot. 10: 227. 1923.) General habit of the typical form of the species; umbels 1–2-flowered; calyx-teeth 2.5 mm. long, over half as long as the tube; corolla 9–10 mm. long. Arid Transition Zone; southern Sierra Nevada, in Tulare and Kern Counties, California.

10. *LOTUS* [Tourn.] L. Sp. Pl. 773. 1753.

Perennial or annual herbs with 3–5-foliolate leaves, and foliaceous stipules. Flowers umbellate, yellow or white, often tinged with red. Calyx-teeth subequal. Standard ovate or orbicular; wings oblong to obovate; keel incurved, obtuse or beaked. Stamens diadelphous. Ovary sessile. 1- to several-ovuled. Pod linear or oblong, compressed or terete, 2-valved, 1- to several-seeded. [The Greek name of several different plants.]

A genus of about 90 species, natives of the Old World. Type species, *Lotus corniculatus* L.

1. *Lotus corniculatus* L. Bird's-foot Trefoil. Fig. 2749.

Lotus corniculatus L. Sp. Pl. 775. 1753.

Perennial from an elongated root, appressed-pubescent or glabrate, the stems slender, decumbent or ascending, 10–50 cm. long. Leaves 3-foliolate, short-petioled; leaflets obovate to oblong, 6–15 mm. long, obtuse or acute; stipules resembling the leaflets, and nearly as large; peduncles about 1 cm. long; umbels 3–12-flowered; calyx-lobes equaling or shorter than the tube; corolla 12–18 mm. long, bright yellow or the standard reddish; pod linear, 20–25 mm. long.

Waste places and on ballast, Portland, Oregon. Type locality: Europe. June.

Lotus angustissimus L. Sp. Pl. 774. 1753. (Slender Lotus.) Annual, branching from the base and prostrate, villous. Leaflets 5, lanceolate, 5–7 mm. long, the two lower simulating stipules; flowers solitary or in pairs on slender axillary bibracteate peduncles, yellow, 4 mm. long; calyx-teeth nearly as long as the corolla. Naturalized along the coast of Sonoma and Mendocino Counties, California. Native of Europe.

11. *PSORALEA* [B. Juss.] L. Sp. Pl. 762. 1753.

Herbs or shrubs, heavy-scented with dark glands or pellucid dots. Leaves alternate, 1–5-foliolate; stipules large. Flowers mainly in pedunculate spikes or racemes, purple, blue, pink or white. Calyx-lobes nearly equal, or the lower longer, the upper sometimes united. Petals distinct from the stamen tube; standard ovate to orbicular, clawed; wings oblong or falcate; keel obtuse, incurved. Stamens monadelphous or diadelphous. Ovary sessile or short-stipitate, 1-ovuled. Pod ovoid, indehiscent. [Name Greek, meaning scurfy, from the glandular dots.]

About 120 species of wide geographic distribution. Type species, *Psoralea pinnata* L.

Leaves 3-foliolate; pods indehiscent; plants from rootstocks.

Leaves pinnately 3-foliolate. (*Hoita*)

Stems erect.

Calyx-teeth short, subequal; corolla ochroleucous or whitish with a purple-tipped keel.

Leaflets broadly ovate; calyx inflated in fruit, the lobes 1–2 mm. long. 1. *P. physodes*.

Leaflets lanceolate-ovate, firm; calyx not inflated in age, the lobes 3–5 mm. long.

2. *P. rigida*.

Calyx distinctly irregular, the lower lobe much longer than the others and separated from them by a deeper sinus.

Inflorescence well exceeding the leaves; corolla 8–10 mm. long; stipules lanceolate-subulate.

3. *P. macrostachya*.

Inflorescence shorter than the leaves or barely equaling them; corolla 15 mm. long; stipules ovate-lanceolate.

4. *P. strobilina*.

Stems prostrate; leaves and flowers erect, long-stalked.

5. *P. orbicularis*.

Leaves palmately 3-foliolate. (*Psoralidium*)

6. *P. lanceolata scabra*.

Leaves 4–5-foliolate, palmate, or the central leaflet sometimes petiolulate; plants subacaulescent from a deep-rooted fusiform root; pods dehiscent. (*Pediomelum*)

Lower calyx-lobe not conspicuously larger than the others; seeds smooth.

7. *P. californica*.

Lower calyx-lobe much larger than the others; seeds reticulate.

8. *P. castorea*.

1. *Psoralea physodes* Dougl. California Tea. Fig. 2750.

Psoralea physodes Dougl. ex Hook. Fl. Bor. Amer. 1: 136. 1831.

Lotodes physodes Kuntze, Rev. Gen. Pl. 194. 1891.

Hoita physodes Rydb. N. Amer. Fl. 24: 8. 1919.

Perennial, with a creeping rootstock; stems erect, 3–8 dm. high, glabrous or sparsely pubescent with mostly black hairs, prominently striate and grooved. Petioles 2–5 cm. long; leaflets ovate to broadly ovate-rhombic, 2–6 cm. long, sparsely puberulent and rather minutely punctate-glandular, mucronulate; peduncles 3–10 cm. long, sparsely pubescent; racemes dense, 15–25 mm. long; rachis and pedicels villous-pubescent with black hairs; calyx glandular-dotted and pubescent with black and whitish hairs, conspicuously enlarged in fruit, the tube 4 mm. long in flower and 6–7 mm. in fruit; lobes triangular, acuminate, shorter than the tube; corolla 10–12 mm. long, ochroleucous, the keel purple-tipped, standard oblanceolate; pod 6 mm. long, compressed-ovoid.

Open forests, Upper Sonoran and Transition Zones; Vancouver Island and eastern Washington to southern California. Type locality: Great Falls of the Columbia, Washington. April–June.

2. *Psoralea rigida* Parish. Parish's *Psoralea*. Fig. 2751.

Psoralea rigida Parish, Bull. Torrey Club 19: 91. 1892.

Hoita rigida Rydb. N. Amer. Fl. 24: 9. 1919.

Perennial from a rootstock, the stems erect, 3–6 dm. high, rather sparsely puberulent, sparingly glandular-dotted with sessile or slightly raised glands. Stipules lanceolate-subulate, 1 cm. long; petioles 2–4 cm. long, sparsely puberulent or glabrate, glandular-dotted; leaflets ovate-lanceolate, acute, or those of the lower leaves ovate, glandular-punctate, glabrous above, sparingly pubescent beneath, 3–10 cm. long, subcoriaceous; peduncles 3–7 cm. long; racemes dense, 2–3 cm. long; bracts lanceolate, acuminate, 4–5 mm. long, white-pubescent, more or less persistent; calyx short-pubescent, conspicuously punctate-glandular; tube 4–5 mm. long, the lowest lobe 5 mm. long, a little exceeding the others; corolla 10–12 mm. long, ochroleucous with purple-tipped keel; standard oblanceolate.

Dry hillsides, Upper Sonoran and Arid Transition Zones; mountains of San Diego County, California. Type locality: Oak Grove, California. June–July.

3. *Psoralea macrostachya* DC. Leather Root. Fig. 2752.

Psoralea macrostachya DC. Prod. 2: 220. 1825.

Lotodes macrostachyum Kuntze, Rev. Gen. Pl. 194. 1891.

Hoita macrostachya Rydb. N. Amer. Fl. 24: 9. 1919.

Perennial, the stems 5–30 dm. high, glabrous to canescent-puberulent. Stipules 3–5 mm. long, subulate; petioles 3–12 cm. long; leaflets 2–8 cm. long, ovate-rhombic to ovate-lanceolate, glabrate to cinereous-pubescent; peduncles 4–10 cm. long, glabrous to cinereous; racemes rather narrow, 5–12 cm. long; rachis densely white- or black-pubescent; bracts ovate to rhombic, cuspidate, caducous, 5–8 mm. long; calyx densely villous, the lobes unequal, the cleft between the upper two the shortest, and those on each side of the lowest lobe deepest, the lowest lobe about equaling or exceeding the purple corolla; standard suborbicular, 10 mm. long; stamens diadelphous.

Moist ground along streams, wet meadows and salt marshes, Upper Sonoran and Transition Zones; Coast Ranges, central California to San Diego County. Type locality: reported as Nootka, but probably Monterey, California. May–July. A variable species, and several species have been proposed. *Hoita rhomboida*, *H. longiloba*, *H. villosa*, *H. Hallii* Rydb. (N. Amer. Fl. 24: 9–10. 1919); and *Psoralea Douglasii* Greene (Erythraea 3: 99. 1895) represent minor geographic variations possibly with a subspecific rank. California Hemp.

4. *Psoralea strobilina* Hook. & Arn. Loma Prieta *Psoralea*. Fig. 2753.

Psoralea strobilina Hook. & Arn. Bot. Beechey 332. 1838.

Lotodes strobilinum Kuntze, Rev. Gen. Pl. 194. 1891.

Hoita strobilina Rydb. N. Amer. Fl. 24: 11. 1919.

Perennial from a rootstock, the stems erect, 6–10 dm. high, densely puberulent with intermingling long viscid hairs, and short tack-shaped glandular ones. Stipules ovate, cuspidate, petioles 3–7 cm. long; leaflets 3–6 cm. long, broadly ovate to suborbicular, those of the lower leaves sometimes broader than long, pubescent and abundantly glandular-punctate; peduncles 4–6 cm. long, with pubescence the same as on the stem; racemes dense, 3–6 cm. long; rachis densely black-hairy; bracts broadly ovate, acuminate, glandular and hirsute; calyx densely villous-hirsute, and glandular; tube 5 mm. long; teeth linear-lanceolate, acuminate, the upper 8–10 mm. long, the lowest 12 mm. long; corolla purple, 15 mm. long, the standard obovate; stamens diadelphous.

Hillsides, Upper Sonoran Zone; central California from Contra Costa County to Santa Clara and Santa Cruz Counties. Type locality: California. May–July.

5. *Psoralea orbiculàris* Lindl. Round-leaved *Psoralea*. Fig. 2754.

Psoralea orbicularis Lindl. Bot. Reg. 23: pl. 1971. 1837.

Lotodes orbiculare Kuntze, Rev. Gen. Pl. 194. 1891.

Hoita orbicularis Rydb. N. Amer. Fl. 24: 11. 1919.

Perennial, the stems prostrate or creeping, glabrous or strigose, glandular-punctate. Leaves 3-foliate, erect; petioles 1–5 dm. long; leaflets orbicular-obovate, 3–8 cm. long, glabrous to cinereous-puberulent; stipules ovate; peduncles erect, 2–7 dm. long; racemes dense, 5–25 cm. long; bracts oblong-lanceolate, 1–2 cm. long, scarious, conspicuously glandular-dotted and rather sparsely villous-hirsute; calyx densely villous; tube 4–5 mm. long; lobes linear-lanceolate, acuminate, the lowest 15 mm. long, the others about 10 mm. long; corolla reddish purple, 15 mm. long.

Moist places, Upper Sonoran and Transition Zones; Siskiyou Mountains, south in the Coast Ranges and the Sierra Nevada to the Cuyamaca Mountains, California. Type locality: California. May–July.

6. *Psoralea lanceolata* subsp. *scàbra* (Nutt.) Piper. Lance-leaved *Psoralea*. Fig. 2755.

Psoralea scabra Nutt. in Torr. & Gray, Fl. N. Amer. 1: 300. 1838.

Lotodes ellipticum var. *latifolium* Kuntze, Rev. Gen. Pl. 193. 1891.

Psoralea Purshii Vail, Bull. Torrey Club 21: 94. 1894.

Psoralea lanceolata Purshii Piper in Piper & Beattie, Fl. Palouse Reg. 106. 1901.

Psoralea lanceolata scabra Piper, Contr. U.S. Nat. Herb. 11: 364. 1906.

Perennial from a rootstock; stems branching from the base, erect or adsurgent, 1–6 dm. high, strigose and glandular-punctate. Stipules lanceolate-subulate; petioles 15–25; leaflets narrowly obovate to oblanceolate, 15–40 mm. long, mucronate, sparingly strigose, and conspicuously glandular-punctate; peduncles 2–4 cm. long; racemes 1–2 cm. long; bracts persistent, 3–4 mm. long; calyx 3 mm. long, white-hairy, the teeth triangular, much shorter than the tube; corolla 5 mm. long, white; pod globose, 5 mm. long, densely long-villous.

Dry ridges and sand hills, Upper Sonoran Zone; eastern Washington to Wyoming, south to eastern Oregon, Nevada, and northern Arizona. Type locality: "On the Walla-Wallah." May–July.

7. *Psoralea californica* S. Wats. California *Psoralea*. Fig. 2756.

Psoralea californica S. Wats. Proc. Amer. Acad. 12: 251. 1877.

Lotodes californicum Kuntze, Rev. Gen. Pl. 194. 1891.

Psoralea monticola Greene, Erythraea 3: 98. 1895.

Pediometum californicum Rydb. N. Amer. Fl. 24: 21. 1919.

Perennial from a fusiform woody taproot, with a branched crown, herbage silvery-villous. Basal leaves with petioles often 6–8 cm. long, bearing racemes in the axils, larger plants with 2 to several scape-like stems 1–2 dm. long, bearing leaves and axillary racemes toward the

apex; leaflets 5–6, broadly obovate, rounded at apex, cuneate at base, 12–25 mm. long; peduncles 2–4 cm. long; racemes 1.5–3 cm. long; calyx densely white-villous; corolla 12 mm. long, scarcely surpassing the lanceolate-subulate calyx-lobes, the standard whitish, the other petals purple; pod oblong-ovoid, the body 6 mm. long, the beak a little longer.

Gravelly soil, Upper Sonoran and Arid Transition Zones; northern Inner Coast Ranges and the southern Sierra Nevada, California, to northern Lower California. Type locality: "at McGinnis' Ranch, near head of Salinas River," California.

8. *Psoralea castorea* S. Wats. Beaver *Psoralea*. Fig. 2757.

Psoralea castorea S. Wats. Proc. Amer. Acad. 14: 291. 1879.

Lotodes castoreum Kuntze, Rev. Gen. Pl. 194. 1891.

Pediomelum castoreum Rydb. N. Amer. Fl. 24: 22. 1919.

Perennial from a deep-rooted fusiform taproot, producing usually a single stem each season; underground portion of stem slender, glabrous, bearing 2 or 3 scarious stipular bracts, that above ground erect, 2–3 cm. high, densely clothed with leaves and racemes, and sometimes producing one or two short branches, densely silvery-silky-pubescent. Leaves 4–5-foliolate; petioles stout, 5–12 cm. long; leaflets broadly cuneate-obovate, rounded to subcordate at apex, 15–30 mm. long; peduncle 2–4 cm. long; racemes dense, 2–3 cm. long; calyx 15 mm. long, the lower lobe oblanceolate, the others subulate; corolla scarcely exceeding the calyx.

Dry sandy deserts, Lower Sonoran Zone; near Barstow, Mojave Desert, California, to southern Utah and northern Arizona. Type locality: "Between Beaver Dam, Arizona, and St. Thomas, Nevada," according to the collector (Palmer, Amer. Nat. 12: 601). April–May.

12. *AMÓRPHA* L. Sp. Pl. 713. 1753.

Shrubs, with gland-dotted and more or less heavy-scented foliage. Leaves odd-pinnate, with entire petiolulate leaflets and setaceous stipules. Inflorescence a spike-like raceme; bracts narrow, deciduous. Calyx turbinate, 5-lobed, slightly oblique. Standard petal only one present, the others wanting, purple, blue or white. Stamens 10, the filaments united at the base only. Style slender, bearded; ovary 2-ovuled. Pod 1–2-seeded, indehiscent, oblique, rounded and broader at the apex. Seeds oblong or slightly curved. [Greek, meaning deformed, in reference to the corolla.]

Branchlets and leaf-rachis with prickle-like glands; calyx-teeth triangular-lanceolate, over half the length of the tube.

Branchlets and leaf-rachis without prickle-like glands; calyx-teeth short-triangular.

1. *A. californica*.

2. *A. occidentalis*.

1. *Amorpha californica* Nutt. California False Indigo. Fig. 2758.

Amorpha californica Nutt. in Torr. & Gray, Fl. N. Amer. 1: 306. 1838.

Shrub 1–3 m. high, the branches pubescent and beset with scattered prickle-like glands. Leaves 1–2 dm. long, ascending; petioles about 1 cm. long, these and the leaf-rachis pilose and with scattered prickle-like glands; leaflets 11–25, broadly oval to elliptic, rounded at both ends or retuse and mucronate at apex, 1–3 cm. long, pilose on both surfaces; racemes 5–20 cm. long, the rachis pilose; calyx 5–6 mm. long, densely pilose, 10-grooved; lobes lanceolate, nearly equaling the tube; standard reddish purple, obovate-cuneate, 5 mm. long; pod curved on the back, 8 mm. long, 3 mm. wide, puberulent and conspicuously glandular-dotted.

Wooded slopes, Upper Sonoran and Transition Zones; California Coast Ranges from the Santa Lucia Mountains to the Santa Ana and San Bernardino Mountains, southern California. Type locality: Santa Barbara, California. May–July.

Amorpha californica var. *hispidula* (Greene) Palmer, Journ. Arn. Arb. 12: 163. 1931. (*Amorpha hispidula* Greene, Fl. Fran. 14. 1891.) This variety has the conspicuous prickle-like glands but is less pubescent or even glabrous and the calyx-lobes are about half the length of the tube. Shasta and Placer Counties, to Napa, Marin, and Monterey Counties, California. *Amorpha californica* var. *napensis* Jepson (Man. Fl. Calif. 556. 1925) is the glabrate form of this variety.

2. *Amorpha occidentalis* Abrams. Western False Indigo. Fig. 2759.

Amorpha occidentalis Abrams, Bull. N.Y. Bot. Gard. 6: 394. 1910.

Shrub 2–3 m. high, the flowering branchlets minutely strigose. Leaves ascending, 1–2 dm. long, the rachis sparsely pubescent; leaflets oval to oblong, 2–4 cm. long, firm, sparsely strigose, usually rounded and mucronate at apex, acute at base; racemes solitary or 2–4 together, 1–2 dm. long, the rachis sparsely pubescent; calyx 3 mm. long; tube strigose to glabrate; lobes triangular, densely short-villous, acute or the upper obtuse; standard about 5 mm. long, violet-purple; pod 6 mm. long, 2.5 mm. wide, somewhat curved on the back, glabrous, with a few conspicuous glandular dots toward the apex.

Stream banks and canyons, Upper Sonoran Zone; San Bernardino County to San Diego County, California, and adjacent Lower California, east to New Mexico, Chihuahua, and Sonora. Type locality: San Diego River, near the San Diego Mission, California. May–July. This species has been confused with *A. fruticosa* L. of eastern North America.

13. *DÁLEA* Juss. Gen. 355. 1789.

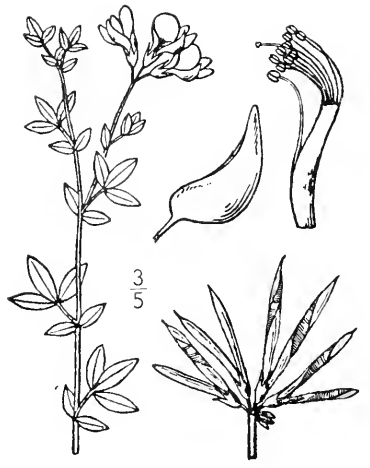
Herbs, shrubs, or small trees. Leaves odd-pinnate or rarely entire, usually glandular-punctate; stipules present, minute. Flowers small, purple, white or yellow, in spikes or spike-like racemes. Calyx-teeth nearly equal or the upper somewhat broader. Standard usually cordate or auriculate, clawed, generally exceeded by the wings and keel. Stamens



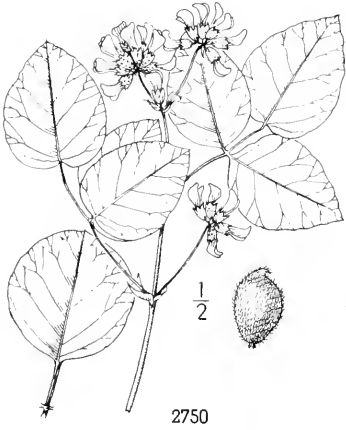
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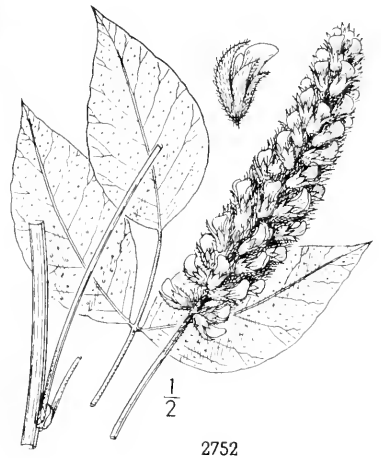
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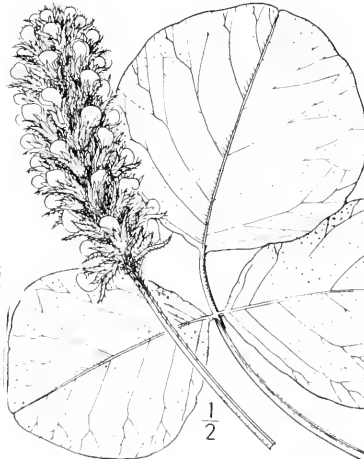
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2747. *Hosackia glabra*
2748. *Hosackia sericea*
2749. *Lotus corniculatus*

2750. *Psoralea physodes*
2751. *Psoralea rigida*
2752. *Psoralea macrostachya*

2753. *Psoralea strobilina*
2754. *Psoralea orbicularis*
2755. *Psoralea lanceolata*

monadelphous, 10 or 9. Ovary sessile or short-stipitate; ovules generally 2, rarely 4-6. Pod rather short, often included in the calyx. [Name in honor of Thomas Dale, early English botanist.]

An American genus of approximately 150 species, extending from the Mississippi Valley and the southwestern United States to Mexico and the Andes. Type species, *Dalea alopecuroides* Willd.

Plants herbaceous or the stems somewhat woody toward the base; leaves pinnate.

Herbage villous-tomentose; flowers in dense spikes; corolla shorter than the densely long-villous calyx.

Calyx, including the lobes, 4-5 mm. long.

1. *D. mollis*.

Calyx, including the lobes, 6-8 mm. long.

2. *D. neomexicana mollissima*.

Herbage silky-canescens, with short appressed hairs; corolla well exceeding the silky calyx.

3. *D. Parryi*.

Plants distinctly woody, becoming shrubs or small trees.

Leaves pinnate.

Flowers in dense subcapitate spikes; corolla little exceeding the calyx, often pubescent; even the older branches tomentose and glandular-dotted.

Glands rather sparse, small and prickly-shaped.

4. *D. Emoryi*.

Glands abundant and conspicuous, flat.

5. *D. polyadenia*.

Flowers in loose elongated spikes or spike-like racemes; corolla well exceeding the calyx, glabrous; older branches glabrous.

Herbage tomentose; leaflets mostly ovate, often obliquely so.

6. *D. arborescens*.

Herbage more or less silky-canescens with short appressed hairs.

Leaflets decurrent on the flattened somewhat winged rachis, linear-lanceolate, densely silky.

7. *D. californica*.

Leaflets narrowed at base and more or less petiolulate.

8. *D. Fremontii* Johnsonii.

Leaves simple, sparse or often wanting in *spinosa*.

Herbage green and nearly glabrous; leaflets very narrowly linear.

9. *D. Schottii*.

Herbage silvery-silky; leaflets linear or linear-lanceolate, often wanting.

10. *D. spinosa*.

1. *Dalea mollis* Benth. Silky Dalea. Fig. 2760.

Dalea mollis Benth. Pl. Hartw. 306. 1848.

Parosela mollis Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Stems herbaceous, branching from the base and spreading, 5-20 cm. long, soft-villous and dotted with small flat brown glands. Leaves canescently soft-villous; leaflets 9-13, cuneate-oblong to obcordate, 3-8 mm. long, dotted near the margin with flat brown glands; inflorescence a densely flowered spike 15-35 mm. long, each flower subtended by 2 gland-like persistent bracts; calyx densely long-villous, 7 mm. long, the teeth filiform, about equaling the tube; calyx 3-4 mm. long, the corolla slightly longer or included, rose-colored; pod obovate, 3 mm. long, densely hirsute, without glands.

Sandy and gravelly soils, Lower Sonoran Zone; Colorado Desert, California, to Lower California, southwestern Arizona, and Sonora. Type locality: collected by Coulter on his trip from Monterey to Yuma. March-June.

2. *Dalea neomexicana* subsp. *mollissima* (Rydb.) Wiggins. Downy Dalea.

Fig. 2761.

Parosela mollissima Rydb. N. Amer. Fl. 24: 64. 1919.

Parosela mollis var. *mollissima* Munz, Bull. S. Calif. Acad. 31: 65. 1932.

Dalea mollis var. *mollissima* Munz, Man. S. Calif. 263. 1935.

Dalea neomexicana subsp. *mollissima* Wiggins, Contr. Dudley Herb. 3: 52. 1940.

Prostrate or decumbent perennial herb, the stems numerous, 1-4 dm. long, densely silky-pilose and glandular-dotted. Leaves 2-4 cm. long; leaflets 11-15, cuneate-obovate, 4-8 mm. long, sparsely pilose or glabrate above, densely villous below; racemes dense, 2-3 cm. long, becoming twice as long in fruit; calyx-tube 3-3.5 mm. long, the lobes filiform-attenuate, 3.5-4.5 mm. long, plumose-villous; corolla white to rose, included in the calyx-lobes; blade of standard orbicular-cordate, 2 mm. long, the claw about the same length; pod 3 mm. long, villous.

Sandy desert slopes and washes, Lower Sonoran Zone; Colorado Desert, southern California, to northern Lower California and southwestern Arizona. Type locality: Las Vegas Wash, Nevada. March-May.

3. *Dalea Parryi* Torr. & Gray. Parry's Indigo-bush. Fig. 2762.

Dalea Parryi Torr. & Gray ex A. Gray, Proc. Amer. Acad. 7: 397. 1868.

Parosela Parryi Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Perennial, the stems branching from the base, ascending, slender and often suffrutescent, 2-5 dm. high, strigose, dotted with small flat glands. Leaves pinnate with a slender rachis 2-4 cm. long; leaflets orbicular to elliptical, 2-4 mm. long, more or less sparsely strigose above, strigose and dotted with flat glands beneath; inflorescence a loosely flowered spike 3-5 cm. long; calyx 3 mm. long, silky-canescens, the teeth ovate, equaling the tube; corolla blue and white, 6 mm. long, the keel well exceeding the wings and banner; pod gibbous, 2 mm. long, glandular.

Gravelly soils, Lower Sonoran Zone; southeastern Mojave and Colorado Deserts, California, to southern Nevada, Arizona, Sonora, and northern Lower California. Type locality: on the Colorado River near the mouth of Williams River. Feb.-May.

4. *Dalea Emoryi* A. Gray. Emory's Indigo-bush. Fig. 2763.

Dalea Emoryi A. Gray, Mem. Amer. Acad. II. 5: 315. 1855.

Parosela Emoryi Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Intricately branched shrub, 1-2 m. high, the branches densely hoary-pubescent and rather sparsely sprinkled with short reddish prickly-like glands. Leaves pinnate, similarly hoary-

pubescent and glandular; leaflets 3–13, usually oblong, 5–10 mm. long, the terminal narrower and longer; spikes head-like, 1–2 cm. long, densely flowered; calyx densely short-villous, and sprinkled with glands, 6–8 mm. long, the teeth subulate, equaling the tube; corolla violet-purple, little exceeding the calyx; pod 3 mm. long, dotted with glands.

Gravelly and sandy soils, Lower Sonoran Zone; Colorado Desert, California, to western Arizona, Lower California, and western Sonora. Type locality: on the desert tablelands of the Gila River, Arizona. Dec.–July.

5. *Dalea polyadenia* Torr. Nevada Indigo-bush. Fig. 2764.

Dalea polyadenia Torr. Bot. King Expl. 64. pl. 9. 1871.

Parosela polyadenia Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Intricately branching shrub, 3–15 dm. high, the branches divaricate, spine-tipped, canescent with short downwardly appressed pubescence, thickly dotted with conspicuous flat amber-colored glands. Leaves pinnate, 1–2 cm. long; leaflets 5–11, obovate, 2–4 mm. long, canescent on both surfaces, and glandular-dotted beneath; spikes subcapitate; calyx 4 mm. long, the tube prominently 10-nerved, canescent and glandular-dotted, the teeth subulate, scarcely equaling the tube; corolla rose-colored or purple, 5–6 mm. long; pod 3–5 mm. long, pubescent above.

Desert regions, Upper Sonoran Zone; Inyo County, California, to Nevada. Type locality: "Borders of the Truckee Desert, Nevada." May–Sept.

Dalea polyadenia var. *subnuda* S. Wats. Bot. Calif. 2: 441. 1880. Leaves and branches glabrous or nearly so; calyx glandular-dotted, the teeth villous-ciliate. Owens Valley, California.

6. *Dalea arborescens* Torr. Mojave Indigo-bush. Fig. 2765.

Dalea arborescens Torr. ex A. Gray, Mem. Amer. Acad. II. 5: 315. 1855.

Parosela arborescens Heller, Cat. N. Amer. Pl. ed. 2. 5. 1900.

Parosela neglecta Parish, Bot. Gaz. 55: 306. 1913.

Much branched shrub, 1–1.5 m. high, the branches rigid and somewhat spinescent, the branchlets hoary-tomentose and bearing scattered slender bristle-like yellowish glands. Leaves pinnate, 15–25 mm. long, hoary-tomentose; leaflets 5–7, rarely 3, mostly obovate, 5–8 mm. long, obscurely glandular; racemes 2.5–5 cm. long; calyx 6–8 mm. long, prominently 10-ribbed, villous-tomentose, obscurely glandular, the teeth lanceolate-subulate, equaling the tube; corolla blue, 10–12 mm. long; ovary densely silky-villous with concealed punctate glands.

Lower Sonoran Zone; apparently a local species of the Barstow and Daggett regions of the Mojave Desert, California. April–May.

7. *Dalea californica* S. Wats. California Indigo-bush. Fig. 2766.

Dalea californica S. Wats. Proc. Amer. Acad. 11: 132. 1876.

Parosela californica Vail, Bull. Torrey Club 24: 17. 1897.

Parosela californica var. *simplifolia* Parish, Bot. Gaz. 55: 309. 1913.

Rigidly much branched shrub, the branches silky-pubescent and very sparsely beset with short prickle-like glands, in age becoming glabrous and often subspinescent. Leaves densely silky-pubescent, pinnate; leaflets 5–7, rarely 3, linear-lanceolate, 6–12 mm. long, the glands obscured by the silky pubescence; racemes 8–15 cm. long; calyx 5 mm. long, thinly silky, and very minutely glandular-dotted, the teeth shorter than the tube; corolla bright blue-purple, 8 mm. long; pod 8 mm. long, thinly silky, without glands.

Desert washes, Lower Sonoran Zone; Colorado Desert and the San Jacinto Valley, California, to Arizona and southern Utah. Type locality: edge of the Colorado Desert, east of Banning, California. May–June.

8. *Dalea Fremontii* var. *Johnsonii* (S. Wats.) Munz. Johnson's Indigo-bush. Fig. 2767.

Dalea Johnsonii S. Wats. Bot. King Expl. 64. 1871.

Parosela Johnsonii Vail, Bull. Torrey Club 24: 17. 1897.

Dalea Fremontii var. *Johnsonii* Munz, Man. S. Calif. 262. 1935.

Shrub 1–2 m. high, the older branches becoming glabrous, the young twigs sparsely silky-pubescent, and very scantily or not at all beset with prickle-like glands. Leaves pinnate, the rachis slender, not winged, 2–3 cm. long; leaflets linear, usually narrowly so, 6–15 mm. long, sparsely silky-pubescent and dotted with small rounded glands, distinctly narrowed at base and more or less petiolulate; racemes about 3 cm. long; calyx 7 mm. long, sparsely strigose and dotted with rather inconspicuous rounded glands, the teeth lanceolate, about equaling the tube, more or less recurved; corolla bright blue-purple, 8 mm. long; pod 8–12 mm. long, covered with yellowish glands.

Desert regions, Lower Sonoran Zone; Providence Mountains, California, to southern Utah. Type locality: "Near St. George on the Virgin River, Utah." April–June.

Dalea Fremontii var. *Saundersii* (Parish) Munz, Man. S. Calif. 262, 598. 1935. Branchlets and leaves with a sparse pubescence of spreading hairs, the former beset with prickle-like yellowish glands. Mojave Desert, Inyo and San Bernardino Counties, California.

9. *Dalea Schottii* Torr. Schott's Indigo-bush. Fig. 2768.

Dalea Schottii Torr. Bot. Mex. Bound. 53. 1859.

Parosela Schottii Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Much branched somewhat spinescent shrub, 1–3 m. high, the older branches smooth and pallid, the young branchlets pale green and glabrous, usually divaricate. Leaves simple, very

narrowly linear, 1–2 cm. long, sparsely strigose and glandular-dotted; racemes 5–10 cm. long, loosely flowered; pedicels 2–3 mm. long; calyx 4–5 mm. long, sparsely strigose toward the apex and on the teeth, rather inconspicuously glandular-dotted, the teeth triangular, scarcely 1 mm. long; corolla 8–10 mm. long; pod 7 mm. long, conspicuously glandular-dotted over the entire surface.

Desert washes, Lower Sonoran Zone; Colorado Desert, California, to southwestern Arizona and northern Lower California. Type locality: "Diluvial banks of the Colorado." Feb.–May.

Dalea Schottii var. *pubérula* (Parish) Munz, Man. S. Calif. 263, 598. 1935. Young branches, young leaves and calyces canescent-puberulent. Western edge of the Colorado Desert, south of the Santa Rosa Mountains, California.

10. *Dalea spinosa* A. Gray. Desert Smoke Tree. Fig. 2769.

Dalea spinosa A. Gray, Mem. Amer. Acad. II, 5: 315. 1855.

Asagracea spinosa Baillon, Adansonia 9: 233. 1870.

Parosela spinosa Heller, Cat. N. Amer. Pl. ed. 2. 7. 1900.

Shrub or small tree 2–6 m. high, the branchlets spinescent and densely silky-canescant, glandular-dotted. Leaves simple, very sparse and often wanting, linear or linear-lanceolate, 5–12 mm. long, glandular-dotted and silky; racemes numerous, 2–3 cm. long, the rachis spinescent even at flowering time; flowers usually about 8–12, short-pedicelled; calyx 4 mm. long, silky, the tube 10-ribbed and beset with a more or less distinct band of conspicuous rounded amber-colored glands, the teeth ovate, scarcely as long as the tube; corolla bright blue-purple, 8–10 mm. long; ovules 4–6; pods about 6 mm. long, pubescent about the base of the style, beset with conspicuous amber-colored glands.

Desert washes, Lower Sonoran Zone; Colorado Desert, California, to southwestern Arizona, Sonora, and Lower California. Type locality: "Arroyos of the Gila; and on the desert west of the Colorado." June–July.

14. PETALOSTÈMON Michx. Fl. Bor. Amer. 2: 48. 1803.

Perennial or rarely annual herbs, more or less glandular-dotted. Leaves odd-pinnate with entire leaflets. Flowers in terminal spikes, perfect; bracts deciduous; calyx campanulate, 10-nerved; lobes triangular to lanceolate. Corolla indistinctly papilionaceous, purple, pink, white, or yellowish; standard free, the others inserted at the mouth of the staminal tube and alternating with the free portion of the filaments. Stamens 5, monadelphous below. Style filiform; ovary 2-ovuled. Pod membranous, obliquely obovoid to subglobose. [Name Greek, referring to the united petals and stamens.]

A genus of about 50 species, native of North America and Mexico. Type species, *Petalostemon candidum* Michx.

Standard rounded at apex; spikes oblong, 15 mm. broad in fruit; bracts much exceeding the calyces.

1. *P. ornatus*.

Standard emarginate at apex; spikes cylindric, 9–10 mm. broad in fruit; bracts about equaling the calyces.

2. *P. Searlsiae*.

1. *Petalostemon ornatus* Dougl. Blue Mountains Prairie Clover. Fig. 2770.

Petalostemon ornatus Dougl. ex Hook. Fl. Bor. Amer. 1: 138. 1830.

Dalea ornata Eaton & Wright, N. Amer. Bot. 219. 1840.

Kuhnistera ornata Kuntze, Rev. Gen. Pl. 192. 1891.

Perennial with a branched woody crown; stems of the season 3–6 dm. high, glabrous, punctate. Leaves ascending, 3–5 cm. long; leaflets usually 5, obovate to broadly elliptic, 1–2 cm. long, rounded or obtuse at the apex, glabrous, glandular-punctate beneath; spikes oblong, 12–15 mm. broad, 2–4 cm. long; bracts broadly obovate, abruptly acuminate, densely villous; calyx 5 mm. long, densely villous; lobes lanceolate, nearly as long as the tube; corolla rose-colored; standard oval, rounded or truncate at the apex; pod 4 mm. long, obliquely obovoid, pubescent.

Dry usually sandy soils, Upper Sonoran Zone; southeastern Washington to Lake County, Oregon, east to Idaho. Type locality: prairies near the Blue Mountains of Lewis [Snake] River, Washington or Oregon. June–Aug.

2. *Petalostemon Searlsiae* A. Gray. Searls' Prairie Clover. Fig. 2771.

Petalostemon Searlsiae A. Gray, Proc. Amer. Acad. 8: 380. 1873.

Kuhnistera Searlsiae Kuntze, Rev. Gen. Pl. 192. 1891.

Perennial with a branched woody caudex, stems of the season 3–5 dm. high, decumbent at base, glabrous, glandular-punctate. Leaves 3–5 cm. long; leaflets 3–7, oblong to oblanceolate, 10–15 mm. long, involute on the margins, pale green, conspicuously punctate beneath, acute at each end; spikes long-peduncled, cylindric, about 1 cm. thick and 1–4 cm. long in fruit; bracts rhombic-oblanceolate, acute or short-acuminate, pubescent below, glabrous above; calyx 4 mm. long, villous; lobes lanceolate, acute or acuminate, scarcely as long as the tube; corolla rose-colored; blade of the standard cordate, 3 mm. long, the claw 4 mm. long.

Dry gravelly or sandy soils, Sonoran Zones; Providence Mountains, and Pahrump Valley, Mojave Desert, California, to southern Nevada, Utah, and northern Arizona. Type locality: Pahrnagat Mountains, southern Nevada. May–June.

15. ROBÍNIA L. Sp. Pl. 722. 1753.

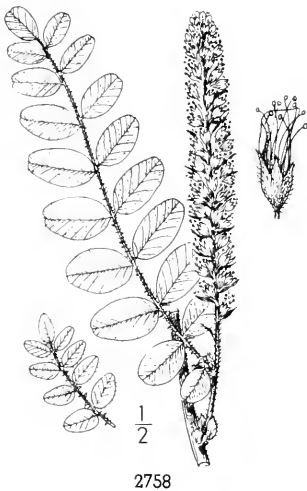
Trees or shrubs with odd-pinnate leaves and showy flowers in axillary or terminal racemes. Stipules small, often spiny. Calyx-teeth short and broad, the two upper slightly



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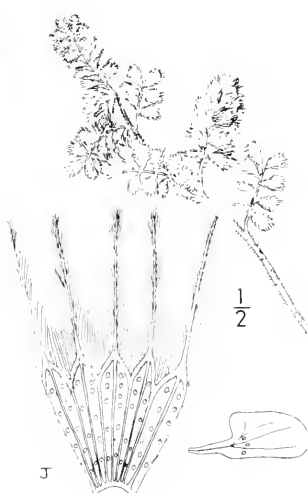
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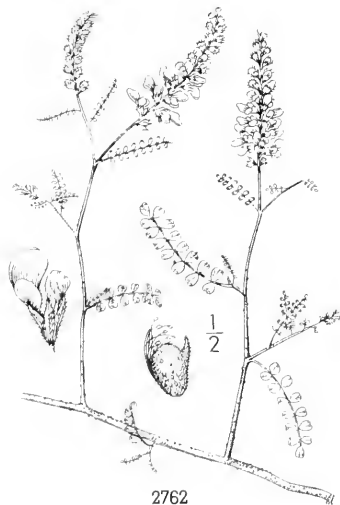
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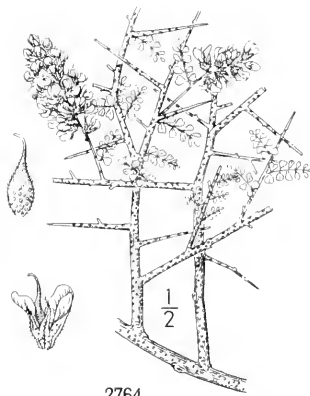
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2756. *Psoralea californica*
2757. *Psoralea castorea*
2758. *Amorpha californica*

2759. *Amorpha occidentalis*
2760. *Dalea mollis*
2761. *Dalea neomexicana*

2762. *Dalea Parryi*
2763. *Dalea Emoryi*
2764. *Dalea polyadenia*



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2765. *Dalea arborescens*
2766. *Dalea californica*
2767. *Dalea Fremontii*

2768. *Dalea Schottii*
2769. *Dalea spinosa*
2770. *Petalostemon ornatus*

2771. *Petalostemon Searlsiae*
2772. *Robinia Pseudo-Acacia*
2773. *Olneya Tesota*

united. Standard large, reflexed; wings oblong, curved; keel obtuse, curved. Stamens 10, diadelphous. Ovary stipitate; ovules many. Pod flat, linear, not septate, tardily 2-valved. [Name in honor of John and Vesparian Robin, who first grew the Locust-tree in Europe.]

About 8 species, natives of North America. Type species, *Robinia Pseudo-acacia* L.

1. *Robinia Pseudo-Acacia* L. Locust-tree. Fig. 2772.

Robinia Pseudo-Acacia L. Sp. Pl. 722. 1753.

Tree with a rough bark, the twigs and foliage nearly glabrous. Stipules often spiny; leaflets 9–19, petiolulate, ovate to oval, entire, 25–50 mm. long; racemes drooping, loosely-flowered; pedicels 6–12 mm. long; flower white or slightly pinkish, fragrant, 15–20 mm. long, the standard yellowish at base; pod 5–10 cm. long, 12 mm. wide, glabrous.

Native of eastern North America, and extensively cultivated. Spreading freely by underground parts and becoming naturalized in the Pacific States from Washington to central California. May–June.

16. *ÓLNEYA* A. Gray, Mem. Amer. Acad. II. 5: 328. 1855.

Canescent spinose trees, with pinnate or odd-pinnate leaves, and obsolete stipules. Racemes axillary. Calyx campanulate, 5-lobed, the two upper lobes united to near the apex. Petals short-clawed, the blade of the standard rounded, reflexed with two callosities at the base; wings obliquely obovate, strongly falcate; keel broadly lunate with a broad basal auricle. Stamens 10, diadelphous. Ovary short-stipitate, several-ovuled. Pod rather turgid, 2-valved, torulose. Seeds broadly ellipsoid, erect. [Name in honor of S. T. Olney, 1812–1878, New England botanist.]

A monotypic genus of the arid southwestern United States and adjacent Mexico.

1. *Olneya Tesòta* A. Gray. Desert Ironwood. Fig. 2773.

Olneya Tesota A. Gray, Mem. Amer. Acad. II. 5: 328. 1855.

Tree 5–8 m. high with a broad crown, and densely canescent branches. Spines 5–10 mm. long, solitary or in pairs beneath the leaves, brown or black-tipped; leaves 3–10 cm. long; leaflets 8–25, oblong to cuneate, 5–20 mm. long, canescent, rounded at the apex; racemes 3–5 cm. long; bracts minute, deciduous; calyx 3–4 mm. long, canescent, the lobes abruptly acute, scarcely as long as the tube; corolla yellow, 8–10 mm. long; pod 4–6 cm. long, nearly 1 cm. wide, puberulent and glandular-pubescent.

Desert washes and valleys, Lower Sonoran Zone; Colorado Desert, California, to western Arizona, Sonora, and Lower California. Type locality: tablelands on the Gila River, Arizona. May–June.

17. *SESBÀNIA* Scop. Introd. 308. 1777.

Herbs or shrubs, with abruptly pinnate leaves, the rachis ending in a setaceous point. Stipules small, scarious, caducous; leaflets numerous, linear-oblong. Flowers in axillary racemes, bracteate. Calyx campanulate, the lobes shorter than the tube. Corolla yellow or the standard purplish; standard with a suborbicular reflexed blade; wings with short claws; keel petals obtuse or rounded. Stamens diadelphous. Ovary short-stipitate, many-ovuled. Pod linear, terete or slightly compressed, with septa between the seeds, 2-valved. Seeds many, narrowly oblong. [Sesban, Arabic name of one of the species.]

About 15 species, natives of the warm-temperate and tropical regions. Type species, *Aeschynomene Sesban* L.

1. *Sesbania macrocarpa* Muhl. Big-podded Sesbania, Bequilla. Fig. 2774.

Sesbania macrocarpa Muhl. Cat. 65. 1813.

Darwinia exaltata Raf. Fl. Ludov. 106. 1817.

Sesban exaltatus Rydb. N. Amer. Fl. 24: 204. 1924.

Sesban sonorae Rydb. N. Amer. Fl. 24: 205. 1924.

Annual, glabrous; stems 3–10 dm. high, striate. Leaves 5–30 cm. long; leaflets 20–70, linear-oblong, 10–25 mm. long, rounded or oblong at each end, somewhat glaucous beneath; racemes 2–6-flowered; bracts and bractlets narrowly linear; pedicels slender, 5–10 mm. long; calyx about 5 mm. long and as broad; lobes triangular-subulate, scarcely 2 mm. long; corolla about 15 mm. long, yellowish, the standard streaked and dotted with purple; pod 10–15 cm. long, 3 mm. wide, tipped with a slender beak, 15–30-seeded; seeds 4 mm. long.

River bottoms and canals, Lower Sonoran Zone; Imperial Valley and the lower Colorado River, California, east to South Carolina and south to Central America. Type locality: South Carolina. March–Oct. Colorado River Hemp.

18. *ASTRÁGALUS* [Tourn.] L. Sp. Pl. 755. 1753.

Annual or perennial herbs, sometimes woody at the base, with odd-pinnate leaves of several to many leaflets and persistent stipules. Flowers purple, white or yellow, in axillary spikes or racemes, rarely umbellate or solitary. Calyx 5-toothed. Petals with narrow blade and slender claw; keel obtuse. Stamens diadelphous. Stigma terminal, minute; ovary sessile or stipitate. Pod coriaceous and turgid, or thin and bladderly-inflated, 1-

celled or becoming 2-celled by intrusion of one or both sutures. Seeds few to many, small, on slender funiculi. [Ancient Greek name of some leguminous plant.]

About 1,500 species, of wide geographical distribution, abundant in northern Asia and western North America. Type species, *Astragalus Christianus* L.

Fruit wholly 1-celled, the lower suture rarely sulcate but if so not forming a partition.

Pod¹ more or less compressed laterally, both sutures prominent.

Leaflets spine-tipped; pods 1-4-seeded.

I. KENTROPHYTA.

Leaflets not spine-tipped; pods with several to many seeds.

II. HOMALOBUS.

Pod not laterally compressed, or only slightly so, the lower suture not prominent; leaflets not spine-tipped.

Pod usually coriaceous or woody in texture.

Valves of the pod not winged.

Calyx campanulate; pods erect.

III. CNEMIDOPHACOS.

Calyx cylindric; pods horizontal.

IV. XYLOPHACOS.

Valves of the pod winged.

V. PTEROPHACOS.

Pod membranous or papery, rarely rather firm.

VI. PHACA.

Fruit perfectly or imperfectly 2-celled, the lower suture inflexed, forming a false, complete or partial partition (septum).

Pod imperfectly 2-celled, the septum not meeting the upper suture.

Pod membranous or papery, more or less inflated.

Body of the pod oval or oblong in outline, the sutures equally curved or the upper more than the lower, the cross-section elliptic to orbicular.

VII. ATELOPHRAGMA.

Body of the pod lunate, the lower suture more strongly curved than the upper, the cross-section deltoid-ovate.

VIII. PHACOMENE.

Pod coriaceous or woody.

Pods linear or linear-lanceolate in outline, the lower suture often sulcate, and the cross-section usually cordate, rarely suborbicular.

IX. TIUM.

Pods oval to elliptic in outline, suborbicular in cross-section, the sides usually a little compressed.

X. BRACHYPHRAGMA.

Pod completely 2-celled, the septum meeting the upper suture.

Pods membranous or papery, inflated.

XI. CYSTIUM.

Pods coriaceous, not strongly inflated.

Body of the pod elongated, linear or rarely oblong in outline.

Pods sessile.

XII. HAMOSA.

Pods stipitate.

X. BRACHYPHRAGMA.

Body of the pod short, ovoid or broadly oblong in section.

Pods distinctly stipitate.

XIII. HESPERONIX.

Pods sessile or subsessile.

Pods erect or ascending, neither didymous nor cross-wrinkled.

XIV. EUASTRAGALUS.

Pods reflexed, more or less, didymous and cross-wrinkled.

XV. HESPERASTRAGALUS.

I. KENTROPHYTA.

Perennial, diffusely branched; leaflets 3-9, subulate to linear-lanceolate, rigid, spinulose-tipped; flowers in small axillary clusters; pods ovoid, flat, 1-celled, with both sutures prominent, 1-2-seeded.

Stipules united only at base, more or less herbaceous; stems 3-4 dm. high, mostly erect; corolla ochroleucous.

1. *A. impensus*.

Stipules united to the middle, scarious; stems scarcely 1 dm. long, spreading or decumbent; corolla purple.

2. *A. tegetarius*.

II. HOMALOBUS.

Perennial herbs, with rootstocks or woody caudex; flowers racemose; calyx campanulate; keel obtuse or narrowed to a slender acute tip; pod usually more or less compressed, membranaceous or chartaceous, 1-celled with no trace of a partition, both sutures prominent; seeds several to many.

Pods sessile or subsessile.

Pod broadly elliptic in outline, 4-5 mm. long.

3. *A. tegetarioides*.

Pod linear in outline, 15-20 mm. long.

Leaflets strigose and canescent on both surfaces; pods strigose.

4. *A. strigosus*.

Leaflets glabrous above and green.

5. *A. scrotinus*.

Pods distinctly stipitate.

Calyx not gibbous at base, less than half as long as the corolla; pod usually membranous.

Leaflets narrowly linear; pods dehiscent first at the base, splitting through the stipe.

Pods glabrous.

Leaflets slightly strigose beneath or glabrous throughout.

6. *A. stenophyllus*.

Leaflets strigose-cinereous on both sides.

7. *A. MacGregorii*.

Pods strigose.

Pods abruptly acutish at apex.

8. *A. filipes*.

Pods acuminate at apex.

9. *A. inversus*.

Leaflets linear to linear-oblong or oval; pods dehiscent first at apex.

Pods glabrous.

10. *A. Antiscellii*.

Pods strigose.

11. *A. gaviotus*.

Calyx strongly gibbous at the base, more than half as long as the corolla; pod rather coriaceous.

Sutures of pods not prominently thickened and coriaceous.

Pods straight or nearly so.

Pods pendulous or divaricately spreading.

Pods short-villous, not mottled, 20-25 mm. long.

12. *A. collinus*.

¹ In giving the measurements of the pod, "wide" or "broad" is used to denote the distance from suture to suture, and "thick" the distance across the pod from valve to valve.

- Pods strigose, usually mottled, 25–30 mm. long. 13. *A. californicus*.
 Pods erect; leaflets linear. 14. *A. Tweedyi*.
 Pods distinctly curved.
 Pods curved less than a circle.
 Stem and leaves pubescent.
 Stem and leaves long-villous. 15. *A. Gibbsii*.
 Stem and leaves pubescent with incurved hairs. 16. *A. Whitedii*.
 Stem and leaves glabrous, except for a sparse pubescence on the lower surface of the leaves. 17. *A. subglaber*.
 Pods spirally curved, forming one and a half to two coils; leaflets linear or oblong.
 Corolla about 10 mm. long; pod 4–4.5 mm. broad, strongly reticulate. 18. *A. speiroparpus*.
 Corolla 5–6 mm. long; pod 3–3.5 mm. broad. 19. *A. alvordensis*.
 Sutures of pods thick and coriaceous; leaflets linear.
 Stipe nearly as long as the flat body of the pod. 20. *A. sclerocarpus*.
 Stipe about half as long as the more turgid body of the pod. 21. *A. bicristatus*.

III. CNEMIDOPHACOS.

Cespitose perennials; racemes strict, many-flowered; calyx-tube deeply campanulate, the teeth linear-lanceolate, equaling the tube; corolla yellow or white; pod coriaceous, oblong-ovoid, rounded dorsally, and somewhat depressed on the upper side, 1-celled, without a partial partition or rarely with a rudimentary one; upper suture usually prominent.

- Pods glabrous; calyx black-hairy. 22. *A. reverentis*.
 Pods pubescent with long hairs; calyx white-hairy. 23. *A. hoodianus*.

IV. XYLOPHACOS.

Low often subcaulescent perennial herbs, usually copiously pubescent; racemes densely flowered, short or subcapitate; calyx cylindric, the lobes shorter than the tube; corolla purple or ochroleucous, or in one species crimson; pod coriaceous or woody, 1-celled, sessile, straight or incurved, the lower suture often slightly sulcate.

- Pods glabrous, strigose or short-pilose.
 Stems glabrous; leaves broadly elliptic or oval; pods coiled to almost a complete circle. 24. *A. iodanthus*.
 Stems decidedly strigose; leaves linear or oblong-linear.
 Pods strigose; leaves linear, rather sparingly strigose. 25. *A. Casei*.
 Pod glabrous; leaves narrowly oblong-obovate, densely silky-canescens. 26. *A. Webberi*.
 Pods long-villous.
 Corolla purple or ochroleucous.
 Pubescence of the leaves strictly appressed. 27. *A. Newberryi*.
 Pubescence of the leaves loosely villous.
 Corolla usually 20–30 mm. or at least over 15 mm. long.
 Calyx-teeth about half as long as the tube; bracts subulate; pod strongly incurved.
 Stems 1–3 dm. high; pod 20–25 mm. long, bent at the middle; corolla purplish. 28. *A. inflexus*.
 Stems less than 1 dm. high; pod 20 mm. long, abruptly bent above the middle, corolla ochroleucous, the keel purple-tipped. 29. *A. incurvus*.
 Calyx-teeth less than one-third the length of the tube; stems usually less than 1 dm. high.
 Leaflets obovate, mostly rounded to retuse at the apex.
 Calyx black-hairy; corolla bluish, 25–30 mm. long. 30. *A. funereus*.
 Calyx white-hairy; corolla rose-purple, 25 mm. long. 31. *A. utahensis*.
 Leaflets elliptic or lanceolate, acute or obtuse.
 Corolla ochroleucous or white, the keel only tipped with purple. 32. *A. Purshii*.
 Corolla purple or purple-tinged.
 Peduncles not exceeding the leaves.
 Leaflets oblanceolate, acute; pod long-acuminate. 33. *A. glareosus*.
 Leaflets elliptic, obtuse; pod short-acuminate. 34. *A. candelarius*.
 Peduncles in flower exceeding the leaves; pod short-acuminate. 35. *A. leucolobus*.
 Corolla not over 15 mm. long.
 Leaflets broadly obovate; keel purple-tipped, corolla otherwise ochroleucous. 36. *A. Jonesii*.
 Leaflets oblanceolate; corolla purple. 37. *A. lectulus*.
 Corolla crimson, even when dry. 38. *A. coccineus*.

V. PTEROPHACOS.

Perennials with a woody cespitose caudex; leaflets linear to filiform; corolla white or purple; pod sessile, woody, 1-celled, the valves winged on the back, the sutures prominent, often narrowly winged.

- A single species in the Pacific States. 39. *A. cinerascens*.

VI. PHACA.

Perennial or annual; calyx campanulate; corolla ochroleucous or purple; keel beakless; pod membranous, inflated, sessile or stipitate, 1-celled, with neither suture intruded, without even a partial partition; seeds numerous.

- Pods papery, indehiscent, or tardily splitting.
 Pods distinctly stipitate.
 Pod acuminate at each end, somewhat compressed. 40. *A. oxyphysus*.

Pod rounded and mucronate or merely acute at apex.

Pod ellipsoid, broadest near the middle.

Corolla ochroleucous or white, stems usually over 3 dm. high (except *A. trichopodus*).

Stipe of the pod well exceeding the calyx.

Corolla twice as long as the calyx or less; leaflets elliptic to broadly linear.

Leaflets pubescent on both surfaces; corolla 12–15 mm. long; pods usually strigose.

Leaflets appressed-silky-pubescent on both surfaces; stipe about two-thirds the length of the body of the pod. 41. *A. asymmetricus*.

Leaflets loosely white-villous; stipe less than half the length of the body of the pod. 42. *A. leucopsis*.

Leaflets glabrous above; pods glabrous. 43. *A. trichopodus*.

Corolla three times as long as the calyx; leaflets narrowly linear. 44. *A. Cusickii*.

Stipe of the pod not exceeding the calyx-lobes. 45. *A. curtipes*.

Corolla purple; plants caespitose, usually less than 3 dm. high.

Pod 40 mm. long; corolla 14–16 mm. long; leaflets glabrous.

Pod 20–25 mm. long; corolla 8–10 mm. long; leaflets strigose.

Pod distinctly obovoid, narrowed from near the rounded apex to the stipe; caespitose plants. 46. *A. oophorus*.
47. *A. nutans*.
48. *A. Whitneyi*.

Pods sessile.

Pod ellipsoid, rarely somewhat ovoid or with the upper suture straight but if so, both sutures rounded.

Pods 2 or more cm. long.

Racemes lax; banner obovate, strongly arched.

Calyx-lobes deltoid, one-fourth to one-third the length of the tube.

Pod rather firm, 20–25 mm. long, broadest near the base, glabrous.

Pod thin, papery, 35–50 mm. long, broadest at or near the middle. 49. *A. oocarpus*.

Leaflets 10–25 mm. long; flowers greenish yellow. 50. *A. Parishii*.

Leaflets 2–6 mm. long; flowers purple. 51. *A. Peirsonii*.

Calyx-lobes lanceolate-subulate, one-half to fully as long as the tube.

Plants strigose or glabrate; calyx-teeth 2 mm. long. 52. *A. Douglasii*.

Plants more or less white-villous; calyx-teeth about 4 mm. long.

53. *A. macrodon*.

Racemes dense; banner oblong-obovate, moderately arched; plants more or less villous.

Pods strigose or glabrous.

Plants green and glabrous or nearly so, often prostrate. 54. *A. pomonensis*.

Plants more or less villous, erect or decumbent at base. 55. *A. Menziesii*.

Pods densely tomentose with short kinky hairs. 56. *A. miguelensis*.

Pods 1 cm. or less in length. 57. *A. microcystis*.

Pod obliquely ovoid, the upper suture usually acute, straight or only slightly convex, less than 2 cm. long.

Annuals or short-lived perennials from a slender taproot and without a woody caudex.

Racemes few-flowered, barely equaling the leaves.

Pubescence of the pod appressed or none.

Pods thinly strigose.

Leaflets obovate; perennial. 58. *A. diurnus*.

Leaflets linear to linear-oblong; annual.

Calyx white-hairy. 59. *A. Geyeri*.

Calyx black-hairy. 60. *A. chuckwallae*.

Pods densely white-strigose; annual.

Flowers white; pods narrowly ovoid, 5–6 mm. wide.

Flowers purple; pods broadly ovoid, 8–11 mm. wide. 61. *A. aridus*.

Pubescence of the pod long-villous and spreading. 62. *A. Harwoodii*.

Racemes many-flowered, about twice as long as the leaves; corolla dark purple; plants canescent. 63. *A. sabulorum*.

64. *A. Vaseyi*.

Perennials, caespitose or, if tall, with a more or less woody base and root.

Plants caespitose; racemes few-flowered; pod villous.

Plants not caespitose; racemes densely flowered.

Pod glabrous; leaves canescent.

Pod short-villous; leaves glabrous.

65. *A. Pulsiferae*.

66. *A. pycnostachyus*.

67. *A. Hornii*.

Pods firm and leathery, splitting into 2 valves at the apex when ripe.

Stipe evident, 5–6 mm. long.

Stipe scarcely evident, 1–2 mm. long; leaflets broadly obovate.

68. *A. Preussii*.

69. *A. Crotalariae*.

VII. ATELOPHRAGMA.

Cauliscent perennials, with rootstocks; stipules nearly distinct; calyx campanulate, the lobes subulate; pod membranous or papery, more or less compressed laterally, usually stipitate, the lower suture intruding and forming a partial partition.

Pods glabrous.

Leaves loosely and densely villous on both sides; pods 8–12 mm. wide.

Leaves rather densely strigose below, glabrous above; pods 4–5 mm. wide.

70. *A. Cottonii*.

71. *A. Forwoodii*.

Pods black-hairy.

Pods 10–14 mm. long, sulcate on lower suture.

Pods 18–22 mm. long, not sulcate on lower suture.

72. *A. alpinus*.

73. *A. Macounii*.

VIII. PHACOMENE.

Cespitose perennials; corolla large; pod short-stipitate, papery or rather leathery, inflated, acute at each end, the upper suture acute, the lower flat or slightly sulcate; septum incomplete, usually narrow and not extending to the apex.

Corolla ochroleucous; pods tapering at each end; calyx-teeth 5-6 mm. long, equaling the tube.

74. *A. weiserensis*.

Corolla purple; pods ovoid, abruptly narrowed to the strongly curved stipe; calyx-teeth 2.5-3 mm. long, shorter than the tube.

75. *A. cinae*.

IX. TIUM.

Perennial herbs; flowers in racemes; calyx campanulate, the teeth nearly equal; corolla purple, white or ochroleucous, banner with a broad erect blade; pod linear or oblong, tapering at each end, more or less stipitate, usually membranous, 1-celled, obcordate or inverted V-shaped in cross-section, the dorsal suture strongly sulcate, rarely with a narrow partial partition.

Pods pendulous, linear or linear-lanceolate in outline.

Pods distinctly stipitate, compressed, deeply but narrowly sulcate on the lower suture.

Pods nearly straight, including the stipe 40-50 mm. long, long-acuminate; corolla 12-14 mm. long.

76. *A. Arthuri*.

Pods distinctly arcuate, 20-30 mm. long, including the stipe.

Plant glabrous or sparingly short-villous.

Corolla white or ochroleucous; pod 3-4 mm. wide.

Leaflets short-villous on both surfaces; corolla 10-12 mm. long.

77. *A. Howellii*.

Leaflets glabrous above; corolla 8 mm. long.

78. *A. misellus*.

Corolla purple; pod 6 mm. wide.

79. *A. inyoensis*.

Plant densely white-tomentose or villous.

Pods glabrous.

80. *A. Nevinii*.

Pods pubescent.

81. *A. Traskiae*.

Pods subsessile, the stipe, if present, much shorter than the calyx, somewhat obcompressed, broadly sulcate on the lower suture.

Racemes lax, exceeding the leaves; pods not mottled.

Septum of the pod extending halfway to the upper suture.

82. *A. mcnsarus*.

Septum very narrow.

Leaflets and pod linear, the latter 2-3 mm. broad.

83. *A. owyheensis*.

Leaflets and pod oblong, the latter 5-6 mm. broad.

84. *A. salmonis*.

Racemes 1-4-flowered, much shorter than the leaves.

85. *A. panamintensis*.

Pods erect or ascending.

Pods distinctly stipitate.

Stipe much exceeding the calyx; pod glabrous.

86. *A. cremiticus*.

Stipe about equaling the calyx; pod strigose.

87. *A. arrectus*.

Pods sessile or subsessile.

Calyx 5-6 mm. long; corolla 12-15 mm. long; plants 3-4 dm. high.

88. *A. conjunctus*.

Calyx 3-4 mm. long; corolla 8-10 mm. long; plants 1-2 dm. high.

89. *A. miser*.

X. BRACHYPHRAGMA.

Perennials; corolla purple or white; pod sessile or short-stipitate, coriaceous, terete or nearly so, oblong-ellipsoid to long-ovoid, splitting at the apex, incompletely 2-celled, the partial septum not meeting the apex nor the upper suture.

Pods densely tomentose, long-ovoid; flowers reflexed.

90. *A. Brauntonii*.

Pods strigose or glabrous, oblong; flowers spreading.

Pod sessile or subsessile.

Leaflets linear, glabrate above; pod spreading, about 3 cm. long, glabrous.

91. *A. Serenoi*.

Leaflets elliptic or oval, white-strigose on both surfaces; pod strigose.

92. *A. mohavensis*.

Pod distinctly stipitate, the stipe about 7 mm. long; leaflets narrowly linear, strigose on both surfaces.

93. *A. pachypus*.

XI. CYSTIUM.

Perennials, with glabrous, sparingly pubescent, or cinereous leaves; flowers ochroleucous or purple; calyx short-cylindric or campanulate, the teeth subulate; pod membranous, much inflated, perfectly 2-celled by the intrusion of both sutures, several-seeded.

Racemes elongated, loosely flowered except in *A. tehachapiensis*; biennials or short-lived perennials, usually flowering as winter annuals.

Pods and usually the whole plant densely white-silky; corolla blue-purple or rarely white.

Corolla 15 mm. long; pods well-inflated and broadly ovoid.

94. *A. Coulteri*.

Corolla 10-12 mm. long; pod little inflated, lanceolate, strongly arcuate.

95. *A. agninus*.

Pods rather thinly strigose with curved hairs.

Calyx white-hairy, rarely with a few black hairs.

Pods firm, usually mottled, strigose with curved hairs.

96. *A. Arthu-Schottii*.

Pods thin, papery, shining, glabrous or thinly strigose.

97. *A. Fremontii eremicus*.

Calyx black-hairy.

Stems and leaves white-tomentose; calyx with spreading hairs.

98. *A. nigricalycis*.

Stems and leaves very thinly strigose or glabrous; calyx appressed-pubescent.

99. *A. tehachapiensis*.

Racemes subcapitate, densely flowered; plants perennial, the stems prostrate or decumbent.

Plants not cespitose, the stems prostrate, slender, often 40-50 dm. long; leaflets densely white-silky, at least when young.

100. *A. albifolius*.

Plants caespitose, the stems 2–30 cm. long.

Leaflets densely white-silky; stems seldom over 5 cm. long.

101. *A. platytropis*.

Leaflets sparsely strigose or glabrous; stems mostly 10–30 cm. long.

Pods glabrous; leaflets glabrous or nearly so, obovate, flat.

Pods firm coriaceous, 25–30 mm. long, arcuate; corolla 12–15 mm. long.

102. *A. araneosus*.

Pods thin and papery, subglobose, not strongly arcuate; corolla 10 mm. long.

103. *A. salinus*.

Pods strigose, rather firm (see also *A. araneosus*).

Leaflets not conduplicate, glabrous or very sparsely strigose; pods ovoid, strongly arcuate.

104. *A. lentiginosus*.

Leaflets conduplicate, rather crowded, sparsely strigose, at least below.

Flowers white or ochroleucous; pods ovoid, only slightly arcuate, thin.

105. *A. ineptus*.

Flowers purple; pods oblong-lanceolate, strongly arcuate, firm-coriaceous.

106. *A. idriensis*.

XII. HAMOSA.

Annual or perennial plants with decumbent or tufted stems; calyx short-campanulate, the teeth subulate; corolla usually purplish, the standard with a rather broad, erect blade, the wings usually longer than the keel; pods linear, laterally flattened, membranous, completely 2-celled by the intrusion of the lower suture; seeds numerous.

Perennials with a caespitose caudex or rootstock.

Pods linear or linear-oblong, 15–40 mm. long.

Pods villous.

Calyx black-hairy; pods 25–40 mm. long; corolla purple or purple-tipped.

Pubescence spreading; pod moderately arcuate, acute or short-acuminate.

107. *A. malacus*.

Pubescence ascending or appressed; pod strongly arcuate.

108. *A. Layneae*.

Calyx white-hairy; pod about 15 mm. long; corolla white or ochroleucous.

109. *A. Andersonii*.

Pods strigose or glabrous.

Pods glabrous.

Calyx-tube cylindric-campanulate, 6–7 mm. long, much longer than the teeth; corolla 15 mm. long.

110. *A. succumbens*.

Calyx-tube campanulate, less than 5 mm. long, about equaled by the teeth; corolla 10 mm. long or less.

Wing petals 2-lobed; plants acaulescent, densely silvery.

111. *A. calycosus*.

Wing petals entire; plants leafy-stemmed, canescent or glabrate.

Stem and leaves glabrous or nearly so.

112. *A. umbraticus*.

Stem and leaves pubescent.

Pods not sulcate dorsally; corolla purple.

113. *A. bernardinus*.

Pods broadly sulcate on the back, triangular in cross-section; corolla white.

114. *A. tricarinatus*.

Pods strigose.

Leaflets sparsely strigose below, glabrate above.

115. *A. drepanolobus*.

Leaflets canescent or silky.

Calyx more or less black-hairy; corolla white, about 15 mm. long.

116. *A. Congdonii*.

Calyx white-hairy; corolla purple, 8 mm. long.

117. *A. albens*.

Pods lanceolate, less than 10 mm. long, tapering from near the base to an acuminate apex.

118. *A. Clevelandii*.

Annuals.

Keel obtuse, not beaked.

Calyx black-hairy; corolla 7–10 mm. long.

Pods less than 2 cm. long.

Pods 4 mm. wide, glabrous; inflorescence short-racemose.

119. *A. Bruceae*.

Pods 2 mm. wide, strigose or rarely glabrous; inflorescence subcapitate.

120. *A. tener*.

Pods 2.5–6 cm. long.

Pods 2.5 cm. long, strongly arcuate and spreading.

121. *A. Clarianus*.

Pods 3.5–6 cm. long, straight or only slightly arcuate, ascending.

122. *A. Rattanii*.

Calyx white-hairy; corolla 4–6 mm. long.

123. *A. austrinus*.

Keel produced into a porrect beak.

124. *A. acutirostris*.

XIII. HESPERONIX.

Cespitose perennials with woody rootstocks, the stems decumbent or ascending; calyx campanulate, the lobes subulate; pods stipitate, coriaceous, completely 2-celled, the lower suture little or not at all sulcate; septum formed by the lower suture extending to the upper.

Pod and stipe distinctly curved, thin-coriaceous.

125. *A. Bolanderi*.

Pod straight and not recurved on the stipe, thick-coriaceous.

Body of the pod 8–20 mm. long.

Pod pubescent, the body 8–15 mm. long.

126. *A. accidens*.

Pod glabrous, 15–20 mm. long, somewhat fleshy, becoming strongly wrinkled when dry.

127. *A. Watsonii*.

Body of the pod 30–40 mm. long; leaflets villous on the margins and midrib.

128. *A. vallis*.

XIV. EUASTRAGALUS.

Perennial or annual herbs; calyx campanulate to cylindric; corolla purple or white, rarely ochroleucous or yellow; keel not beaked; pods ovoid to oblong, chartaceous, turgid, completely 2-celled, dehiscent; septum formed by the intruded lower suture; seeds few to many.

Plants perennial from woody rootstocks.

Pods ascending or spreading; racemes densely flowered.

Flowers deflexed or spreading in anthesis; lower suture of pod slightly sulcate; pods ellipsoid, spherical or nearly so in cross-section. 129. *A. Mortonii*.

Flowers erect in anthesis; lower suture deeply sulcate; pod ovoid, cordate or triangular in cross-section.

Pod appressed-pubescent. 130. *A. striatus*.

Pod villous with spreading hairs.

Stems glabrous or sparingly strigose. 131. *A. goniatus*.

Stems villous-pubescent.

Corolla white; stems 2-5 dm. high. 132. *A. Spaldingii*.

Corolla purple; stems less than 2 dm. high. 133. *A. Austiniae*.

Pods deflexed, lenticular in outline; racemes loosely flowered, corolla white or ochroleucous.

Racemes elongated, many-flowered, usually longer than the leaves. 134. *A. Lyallii*.

Racemes short, rather few-flowered, usually shorter than the leaves.

Leaves and stems villous; pod abruptly acute. 135. *A. lentiformis*.

Leaves and stems strigose; pod gradually acute. 136. *A. Lemmonii*.

Plants annual; beak of the pod equaling the ovoid deeply sulcate body. 137. *A. Breweri*.

XV. HESPERASTRAGALUS.

Slender annuals, with distinct stipules; leaflets usually retuse; flowers subsessile in heads or short spikes, usually crowded, small, rarely over 8 mm. long; calyx long-villous; pods didymous, distorted or transversely rugose on the sides, 3-5 mm. long, ovoid to broader than long, coriaceous, not inflated, sessile, 2-celled.

Pods little or not at all exserted beyond the calyx and not reflexed.

Calyx white-hairy; pods deeply and narrowly grooved dorsally, the two lobes approximate, short-pubescent. 138. *A. dispermus*.

Calyx usually black-hairy; pods didymous, the two lobes diverging, minutely and rather sparsely strigose, rarely glabrous. 139. *A. didymocarpus*.

Pods well exserted and strongly reflexed-pubescent with spreading or sometimes appressed hairs.

140. *A. Gambellianus*.

1. *Astragalus impensus* (Sheldon) Woot. & Standl. Nevada Spiny Rattle-weed. Fig. 2775.

Astragalus Kentrophyta var. *clatus* S. Wats. Bot. King. Expl. 77. 1871.

Astragalus viridus var. *impensus* Sheldon, Minn. Bot. Studies 1: 118. 1894.

Kentrophyta impensus Rydb. Bull. Torrey Club 32: 665. 1905.

Astragalus impensus Woot. & Standl. Contr. U.S. Nat. Herb. 19: 369. 1915.

Astragalus montanus var. *impensus* M. E. Jones, Rev. N. Amer. Astrag. 80. 1923.

Perennial, diffusely branched from the base, the stems erect or ascending, 3-4 dm. high, simple or with a few short branches. Stipules united only at the base, lanceolate, with elongated spinulose tips; leaflets 5-7, subulate to linear-lanceolate, 8-15 mm. long, strongly ribbed, spinulose-tipped, strigose; flowers axillary in clusters of 2 or 3; calyx-tube campanulate, 1.5 mm. long, the teeth about 1 mm. long, subulate; corolla ochroleucous, 4 mm. long; banner oblong, reflexed; keel obtuse, shorter than the wings; pod ovoid, flat, 6-7 mm. long, both sutures prominent, 1-2-seeded.

Dry valleys, Upper Sonoran and Transition Zones; eastern Washington to western Colorado, south to Nevada and Arizona. Type locality: "Holmes Creek Valley, Nevada." May-Sept. Spiny Milk Vetch.

2. *Astragalus tegetarius* S. Wats. Alpine Spiny Rattleweed. Fig. 2776.

Astragalus tegetarius S. Wats. Bot. King Expl. 76. 1871.

Kentrophyta tegetaria Rydb. Bull. Torrey Club 34: 421. 1907.

Astragalus montanus var. *tegetarius* M. E. Jones, Rev. N. Amer. Astrag. 81. 1923.

Kentrophyta montana Jepson, Man. Fl. Pl. Calif. 583. 1925. Not Nutt.

Perennial, the stems scarcely 1 dm. long, diffusely spreading or decumbent. Stipules ovate, scarious, 4-5 mm. long, united to near the middle; leaflets 3-9, narrowly linear-lanceolate, rigid, hirsutulose, 5-8 mm. long, spinulose-tipped; peduncles 2-10 mm. long, 1-3-flowered; calyx-tube about 2.5 mm. long, the teeth subulate, 2 mm. long; corolla 5-6 mm. long; pod ovoid, 5 mm. long, 2.5 mm. wide, compressed, hirsutulose.

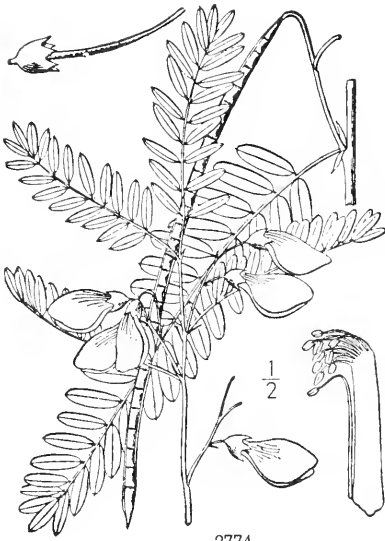
Boreal Zones; Idaho and Montana to Utah and Colorado, southward to eastern Oregon, Sierra Nevada, California, and Nevada. Type locality: "Peaks of the East Humboldt and Clover Mountains, Nevada." July-Aug.

3. *Astragalus tegetarioides* M. E. Jones. Blue Mountains Locoweed. Fig. 2777.

Astragalus tegetarioides M. E. Jones, Contr. West. Bot. No. 10: 66. 1902.

Cespitose perennial, the stems much branched forming dense mats, about 1 dm. long, the whole plant silvery with wavy hairs. Leaves 2.5-4 cm. long, petiole filiform, elongated; leaflets nearly contiguous, 5-7, obcordate, 4-5 mm. long, petiolulate, folded; peduncles filiform, about 2 cm. long; flowers horizontal, usually 6 in the head; calyx-tube about 1 mm. long, the teeth lax, 2 mm. long; banner 3 mm. long, purple-striped, abruptly erect; pod 4-5 mm. long, and about 3 mm. high, chartaceous, flattened laterally but swollen over the solitary seed.

Sandy soil, Arid Transition Zone; Blue Mountains, Oregon. Type locality: Buck Range, southern Blue Mountains, Oregon. May-July.



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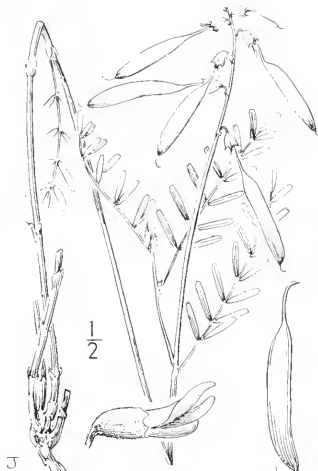
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2774. *Sesbania macrocarpa*
 2775. *Astragalus impensus*
 2776. *Astragalus tegetarius*

2777. *Astragalus tegetarioides*
 2778. *Astragalus strigosus*
 2779. *Astragalus scrobinus*

2780. *Astragalus stenophyllus*
 2781. *Astragalus MacGregorii*
 2782. *Astragalus filipes*

4. *Astragalus strigosus* Coult. & Fisher. Gray-haired Locoweed. Fig. 2778.

Astragalus strigosus Coult. & Fisher, Bot. Gaz. 18: 299. 1893.

Astragalus griseopubescens Sheldon, Minn. Bot. Studies 1: 24. 1894.

Homalobus strigosus Rydb. Bull. Torrey Club 40: 53. 1913.

Perennial, the stems several, decumbent or ascending, 15–35 cm. high, strigose. Leaves 3–8 cm. long; leaflets 13–21, linear to narrowly linear, 1–2 cm. long, strigose and cinereous on both surfaces; racemes lax, 10–20-flowered; calyx-tube 2.5 mm. long, black-hairy, the teeth subulate, about equaling the tube; corolla purplish, about 10 mm. long; keel merely obtuse at tip and dark purple; pods sessile, linear, 15–20 mm. long, about 3 mm. deep, strigose.

Dry plains and ridges, Upper Sonoran and Transition Zones; eastern Washington to Montana. Type locality: Basin, Montana. June–July.

5. *Astragalus serotinus* A. Gray. Late-flowering Rattle-weed. Fig. 2779.

Astragalus serotinus A. Gray, Pacif. R. Rep. 12: 51. pl. 5. 1860.

Homalobus serotinus Rydb. Mem. N.Y. Bot. Gard. 1: 248. 1900.

Phaca serotina Piper, Contr. U.S. Nat. Herb. 11: 374. 1906.

Astragalus campestris var. *serotinus* M. E. Jones, Rev. N. Amer. Astrag. 75. 1923.

Perennial, the stems several, ascending or erect, slender, 2–4 dm. high, strigose. Leaves 8–15 cm. long; leaflets 9–21, linear to linear-lanceolate, glabrous above, strigose beneath, 1–3 cm. long; peduncles slender; racemes lax, 5–15-flowered; flowers spreading, purplish; calyx-tube about 2.5 mm. long, black-hairy; teeth subulate, less than 1 mm. long; corolla 6–8 mm. long; keel with a deep purple broad obtuse tip; pod linear, 20–25 mm. long, about 3 mm. deep, mainly strigose or glabrate in age.

Open pine forests, Arid Transition Zone; British Columbia and eastern Washington as far south as Walla Walla, to Montana. Type locality: "On the Okanogan near the Columbia River." May–July.

Astragalus serotinus var. *Palliseri* (A. Gray) J. F. Macbride, Contr. Gray Herb. 65: 37. 1922. (*Astragalus Palliseri* A. Gray, Proc. Amer. Acad. 6: 227. 1864.) Pod glabrous from the beginning, otherwise closely resembling the typical form of the species which has the pods strigose, at least when young. Columbia Basin region of southeastern Washington and adjacent Oregon.

6. *Astragalus stenophyllus* Torr. & Gray. Narrow-leaved Locoweed. Fig. 2780.

Astragalus leptophyllus Nutt. Journ. Acad. Phila. 7: 18. 1834. Not Desf. 1800.

Astragalus stenophyllus Torr. & Gray, Fl. N. Amer. 1: 329. 1838.

Homalobus stenophyllus Rydb. Mem. N.Y. Bot. Gard. 1: 249. 1900.

Phaca stenophylla Piper, Contr. U.S. Nat. Herb. 11: 371. 1906.

Perennial, usually much branched from the somewhat woody base, the stems slender and wiry, erect or ascending, 3–6 dm. high, glabrous or nearly so. Leaves 5–10 cm. long; leaflets mostly 9–13, rather distant, filiform to narrowly linear, 5–15 mm. long, sparsely strigose; peduncles well exceeding the leaves; flowers in a loose raceme, nodding; calyx campanulate, 5 mm. long, the teeth very minute; corolla ochroleucous, 10–12 mm. long; body of pod linear-oblong, 20–25 mm. long, 4–5 mm. deep, only slightly inflated in age, abruptly acutish at apex, narrowed at base to a filiform stipe, 5–10 mm. long.

Sagebrush plains and hillsides, Upper Sonoran and Arid Transition Zones; British Columbia to western Montana south, east of the Cascades, to northeastern California and northern Nevada. Type locality: "Headwaters of the Missouri." May–July.

7. *Astragalus MacGregorii* (Rydb.) Tidestrom. MacGregor's Rattle-weed. Fig. 2781.

Homalobus MacGregorii Rydb. Bull. Torrey Club 50: 270. 1923.

Astragalus filipes var. *residuus* Jepson, Man. Fl. Pl. Calif. 571. 1925.

Astragalus MacGregorii Tidestrom, Proc. Biol. Soc. Wash. 50: 20. 1937.

Perennial, the branches several from the woody base, erect or ascending, slender, 4–6 dm. high, glaucous, green and somewhat cinereous with a strigose pubescence. Stipules triangular-subulate, erect, thin, about 3 mm. long; leaves 5–7 cm. long; leaflets about 13, linear, 8–15 mm. long, 1.5–3 mm. wide, rounded or retuse at the apex, distinctly petiolulate, gray-green and strigose; peduncles often 10 cm. long; racemes loosely flowered; flowers pedicellate, spreading or recurved; calyx-tube campanulate, 4–5 mm. long, very thin, the teeth triangular, scarcely 1 mm. long; corolla ochroleucous, about 12 mm. long, the banner well exceeding the keel; pod linear-oblong, approximately of equal width throughout, rather abruptly acute at both ends, 20–25 mm. long, about 4 mm. wide, glabrous; stipe filiform, 8–10 mm. long.

Desert slopes, Sonoran Zones; southern California, from Mount Pinos to the Santa Rosa Mountains. Type locality: near the Frazier Borax Mine, Mount Pinos, California. April–May.

8. *Astragalus filipes* Torr. Thread-leaved Locoweed. Fig. 2782.

Astragalus filipes Torr. ex A. Gray, Proc. Amer. Acad. 6: 226. 1864.

Tragacantha filipes Kuntze, Rev. Gen. Pl. 944. 1891.

Homalobus filipes Heller, Muhlenbergia 9: 67. 1913.

Stems slender, branched, 3–10 dm. long, strigose, from a caespitose caudex. Leaflets 7–11, narrowly linear to filiform, 8–15 mm. long, strigose, acute; raceme lax, including the peduncle 1–2 dm. long; calyx-tube 3 mm. long, strigose, the teeth deltoid, 1 mm. long; corolla white, 8 mm.

long; pod pendulous, sparingly strigose, the body oblong, about 20 mm. long, and 4–5 mm. wide, the stipe 8–10 mm. long.

Dry hillsides, Arid Transition Zone; eastern Washington to eastern Oregon, Idaho, and Nevada. Type locality: near Fort Okanogan, Washington. May–June.

9. *Astragalus inversus* Jones. Susanville Rattle-weed. Fig. 2783.

Astragalus inversus Jones, *Zoe* 4: 276. 1893.

Homalobus inversus Rydb. *Bull. Torrey Club* 50: 271. 1923.

Perennial, from an erect fleshy root, the stems decumbent to ascending, slender and lax, 6–10 dm. long, with long internodes, green and sulcate. Stipules green, rigid, subulate, reflexed; leaves about 1 dm. long, the rachis green, scarcely tapering; leaflets 5–11, remote, narrowly linear, the terminal phyllodia-like; peduncles often 3 dm. long, very slender, falcate; raceme loosely few-flowered; calyx-tube campanulate, about 3 mm. long, reddish, the teeth minute; corolla about 10 mm. long, lavender striped with reddish purple; pods horizontal or slightly reflexed, the body 25–40 mm. long, 4–6 mm. wide, nearly flat, reddish, drying purple, straight or slightly arcuate, acute or short-acuminate, narrowed at base to a short stipe, 5–10 mm. long.

Gravelly soils, Arid Transition Zone; Siskiyou and Modoc Counties, California. Type locality: Susanville, California. May–July.

Astragalus Applegatei M. E. Peck, *Proc. Biol. Soc. Wash.* 49: 111. 1936. Stems simple or branched, cespitose or procumbent, glabrous or sparingly strigose, 25–40 cm. long. Leaves 5–8 cm. long; leaflets 9–13, linear or linear-oblong, 1–2 cm. long; racemes 5–7 cm. long; corolla 6–7 mm. long, pale lavender; pod oblong, 8–13 mm. long, 3 mm. wide, compressed, strigulose, and purple-spotted, splitting first at the apex; stipe 4–5 mm. long.

A little known species, originally described from specimens collected at Keno, and near Klamath Falls, Klamath County, Oregon. Resembling most closely *A. filipes* but the pods split first at the apex as in *A. Antisellii*.

10. *Astragalus Antisellii* A. Gray. Antisell's Rattle-weed. Fig. 2784.

Astragalus Antisellii A. Gray, Antisell's Rattle-weed. Fig. 2784.

Astragalus Hasseanus Sheldon, *Minn. Bot. Studies* 1: 124. 1894.

Homalobus Antisellii Rydb. *Bull. Torrey Club* 50: 271. 1923.

Astragalus trichopodus var. *Antisellii* Jepson, *Man. Fl. Pl. Calif.* 572. 1925.

Perennial, the stems erect or ascending, 5–8 dm. high, rather slender, from a woody base, the whole plant more or less sparsely strigose. Stipules subulate, reflexed; leaves 7–15 cm. long; leaflets mostly 21–25, narrowly to broadly oblong, 8–20 mm. long; peduncles usually much longer than the leaves; raceme elongated, loosely flowered; calyx-tube campanulate, 5 mm. long, the teeth triangular, scarcely 1 mm. long; corolla ochroleucous, 10 mm. long; pod 20–25 mm. long, 4–6 mm. wide, flattened laterally or sometimes slightly inflated when ripe, tapering at base to a slender stipe, 7–15 mm. long.

Dry mesas and hillsides, Upper Sonoran Zone; southern California, San Luis Obispo to Los Angeles. Type locality: Santa Ynez, California. March–June.

11. *Astragalus gaviotus* Elmer. Gaviota Rattle-weed. Fig. 2785.

Astragalus gaviotus Elmer, *Bot. Gaz.* 39: 54. 1905.

Homalobus gaviotus Rydb. *Bull. Torrey Club* 50: 272. 1923.

Astragalus trichopodus var. *gaviotus* Jepson, *Man. Fl. Pl. Calif.* 571. 1925.

Astragalus Antisellii var. *gaviotus* Munz & McBurney, *Bull. S. Calif. Acad.* 31: 67. 1932.

Stems stout, from a cespitose caudex, cinereous-strigose, 3–5 dm. high, branched above. Leaflets 15–31, oblong to elliptic, 10–25 mm. long, obtuse to retuse at the apex, strigose on both surfaces; peduncles about 10 cm. long; racemes dense, 2–3 cm. long; calyx-tube 3 mm. long, strigose with both white and black hairs, the teeth subulate, 1 mm. long; corolla white, 15 mm. long; pod pendulous or spreading, strigulose, the stipe 6–8 mm. long, the body elliptic 25–30 mm. long, 6–10 mm. wide, acute at each end.

Rolling hills, Upper Sonoran Zone; Santa Barbara County, California. Type locality: Gaviota, California. April–June.

12. *Astragalus collinus* Dougl. Hill Rattle-weed. Fig. 2786.

Phaca collina Dougl. ex Hook. *Fl. Bor. Amer.* 1: 141. 1830.

Astragalus collinus Dougl. ex G. Don, *Gen. Hist. Pl.* 2: 256. 1832.

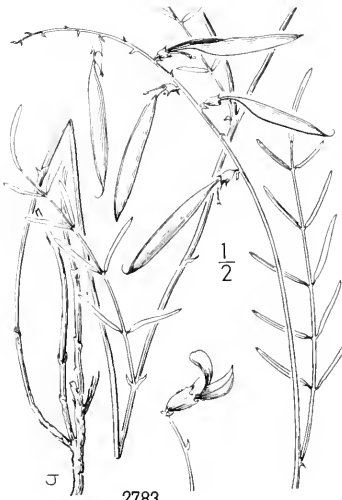
Astragalus cyrtoides A. Gray, *Proc. Amer. Acad.* 6: 201. 1864.

Tragacantha collina Kuntze, *Rev. Gen. Pl.* 943. 1891.

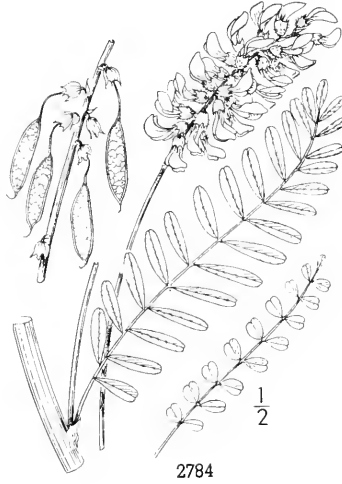
Homalobus collinus Rydb. *Bull. Torrey Club* 40: 53. 1913.

Perennial, the stems several, erect or ascending, 2–6 dm. high, branching freely, strigose. Leaves 3–5 cm. long; leaflets linear to narrowly linear, 5–15 mm. long, obtuse or retuse, pilose with upwardly curved hairs; peduncles stout, 10–30 cm. long, flower-bearing on the upper third; flowers recurved; calyx-tube gibbous at base, broadly cylindric, 7–8 mm. long, the teeth subulate, about 2 mm. long; corolla ochroleucous, 10–12 mm. long, the banner reflexed just beyond the calyx; pod pendulous, linear-oblong, straight or slightly curved upward, 15–20 mm. long, 3 mm. wide, oval in cross-section, upper suture straight, lower curved upward at each end, coriaceous, strigose.

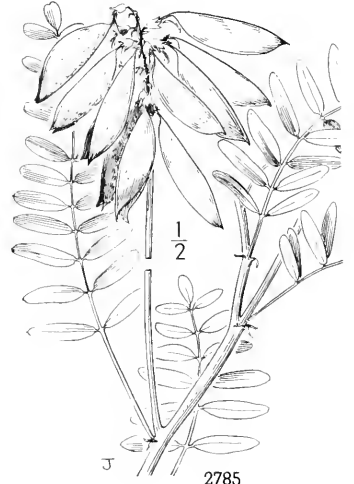
Open hillsides, Arid Transition and Upper Sonoran Zones; eastern Washington and Oregon to Idaho. Type locality: "On the subalpine ranges of the Blue Mountains in dry soils." May–June.



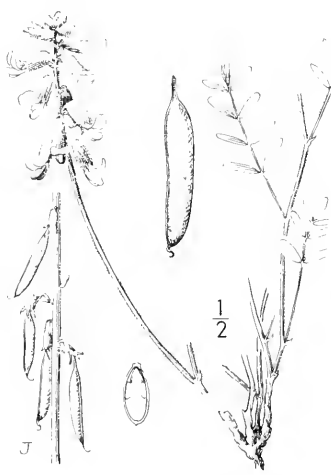
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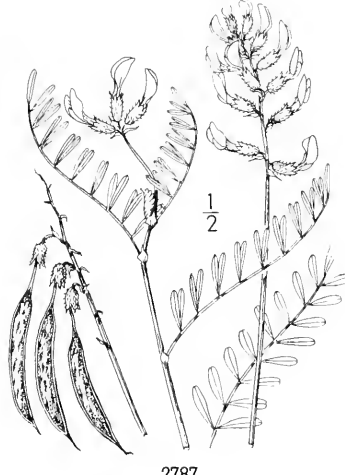
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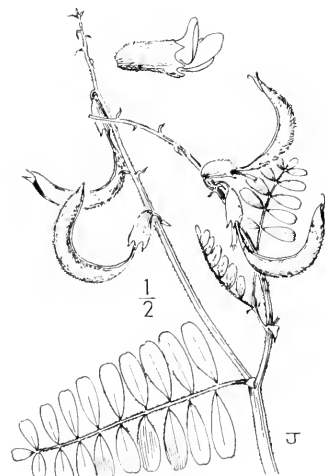
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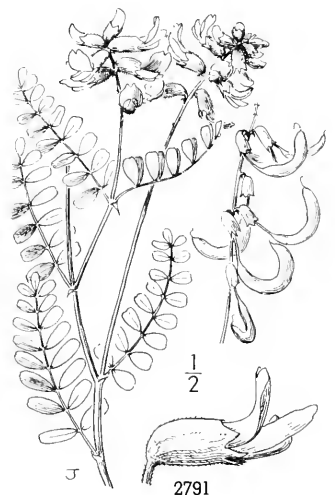
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2783. *Astragalus inversus*
2784. *Astragalus Antisellii*
2785. *Astragalus gaviotus*

2786. *Astragalus collinus*
2787. *Astragalus californicus*
2788. *Astragalus Tweedyi*

2789. *Astragalus Gibbsii*
2790. *Astragalus Whitedii*
2791. *Astragalus subglaber*

13. *Astragalus californicus* (A. Gray) Greene. Klamath Basin Rattle-weed.
Fig. 2787.

Astragalus collinus var. *californicus* A. Gray, Proc. Amer. Acad. 12: 54. 1876.

Astragalus californicus Greene, Bull. Calif. Acad. 1: 157. 1885.

Homalobus californicus Heller, Muhlenbergia 2: 86. 1905.

Perennial, the stems many from the crown, erect, little branched, rather stout, 5–6 dm. high, grayish pubescent with spreading hairs. Leaves 5–7 cm. long; leaflets 15–21, linear or oblong, 5–12 mm. long, often folded, acutish, rather densely pubescent with spreading wavy hairs; peduncles stout, strict, 10–15 cm. long; raceme 8–10 cm. long; flowers many, spreading, 10–15 mm. long, ochroleucous; calyx-tube broadly cylindric, 5–6 mm. long, somewhat gibbous, black-hairy; teeth triangular-subulate, about 1.5 mm. long; pod pendulous or spreading, straight, acute at each end, 3–4 cm. long, 4–5 mm. wide, elliptic in cross-section, coriaceous, strigose when young becoming glabrous, blotched with purple, pendent on a stipe 6–12 mm. long.

Upper Sonoran Zone; valleys of the Klamath River, Siskiyou County, California. Type locality: Yreka, California. April–May.

14. *Astragalus Tweedyi* Canby. Tweedy's Rattle-weed. Fig. 2788.

Astragalus Tweedyi Canby, Bot. Gaz. 15: 150. 1890.

Phaca Tweedyi Piper, Contr. U.S. Nat. Herb. 11: 371. 1906.

Homalobus Tweedyi Rydb. Bull. Torrey Club 51: 14. 1924.

Perennial, much branched from the base, 3–5 dm. high, slender and flexuous, sparsely strigose-pubescent. Leaves 5–6 cm. long; leaflets 15–21, linear, 7–15 mm. long, rather sparsely strigose; peduncles strict in fruit, 10–20 cm. long; racemes 4–7 cm. long; flowers spreading on very short pedicels; calyx-tube cylindric, 6–7 mm. long, gibbous at base, the teeth triangular, about 1 mm. long; corolla 10–12 mm. long, ochroleucous; pods erect, 12–15 mm. long, 4 mm. wide, nearly circular in cross-section, firm-coriaceous, reticulate, glabrous; stipe stout, a little longer than the calyx.

Dry hillsides, Upper Sonoran Zone; Valley of the Columbia, mouth of the Yakima River, Washington, to near The Dalles, Oregon. Type locality: prairies of eastern Oregon. June.

15. *Astragalus Gibbsii* Kell. Gibbs's Rattle-weed. Fig. 2789.

Astragalus Gibbsii Kell. Proc. Calif. Acad. 2: 161. fig. 50. 1862.

Tragacantha Gibbsii Kuntze, Rev. Gen. Pl. 943. 1891.

Homalobus Gibbsii Rydb. Bull. Torrey Club 51: 15. 1924.

Homalobus Plummerae Rydb. op. cit. 51: 16.

Perennial, the stems much branched, decumbent at base, 3–5 dm. high, rather stout, whole plant grayish with a short spreading pubescence. Leaves spreading or often reflexed, 4–5 cm. long; leaflets usually 17–19, oblong-obovate to obovate, obtuse or retuse at apex, 7–20 mm. long; peduncles stout, 6–8 cm. long; fruiting racemes 6–8 cm. long; flowers many, more or less reflexed; calyx-tube broadly cylindric, 7–8 mm. long, gibbous at base, teeth triangular-subulate, 2–3 mm. long; corolla ochroleucous, keel about 10 mm. long, banner strongly reflexed, 2–3 mm. longer than the keel; pod arcuate, the body about 20–25 mm. long, 4–5 mm. wide, almost circular in cross-section, pilose, acuminate at apex, narrowed at base, firm, splitting at the apex; stipe equaling the calyx.

Dry hillsides and plains, Upper Sonoran Zone; eastern Oregon from the western edge of the Columbia Basin east to the Blue Mountains and adjacent Idaho, south to Nevada and northeastern California. Type locality: "Sierra Nevada near the headwater of Carson River," California. June–July.

16. *Astragalus Whitédii* Piper. Whited's Rattle-weed. Fig. 2790.

Astragalus speiroparpus var. *falciformis* A. Gray, Bot. Calif. 1: 152. 1876.

Astragalus speiroparpus var. *curvicaipus* Sheldon, Minn. Bot. Studies 1: 125. 1894.

Astragalus Whitédii Piper, Bull. Torrey Club 29: 224. 1902.

Perennial, the stems several from a caespitose caudex, 2–4 dm. high, more or less strigose. Leaves 5–8 cm. long; leaflets mostly 13–15, oblong-obovate, retuse. 10–15 mm. long, strigose; peduncles 5–8 cm. long; fruiting racemes 4–5 cm. long; calyx-tube 8 mm. long, gibbous at base, the teeth about 1 mm. long; corolla ochroleucous, 15 mm. long; pod curved, forming about a semicircle, the body 15–20 mm. long, 3–4 mm. wide, abruptly acute at both ends, firm-coriaceous, glabrous; stipe slender, about 1 cm. long.

Dry hills, Upper Sonoran Zone; eastern Washington near Wenatchee, to western Idaho, south through eastern Oregon to northeastern California and western Nevada. Type locality: Colockum Creek, 20 miles south-east of Wenatchee, Washington. May–June.

Astragalus sinuatus Piper, Bull. Torrey Club 28: 40. 1901. Perennial, with caespitose caudex, the stems 2–3 dm. high, whole plant short-pubescent with upwardly curved hairs. Leaves 4–5 cm. long; leaflets usually 11–13, elliptic, 10–12 mm. long; peduncles about 6 cm. long; flowers not known; pod 20–25 mm. long, 6–7 mm. wide, curved, thick-walled and turgid, sinuous on the lower suture, rugulose, strigose. Known only from the original collection which was made somewhere in eastern Washington by Brandegee in 1883.

17. *Astragalus subglaber* (A. Gray) M. E. Peck. Glabrous Rattle-weed.
Fig. 2791.

Astragalus collinus var. *subglaber* A. Gray ex Rydb. Bull. Torrey Club 51: 17. 1924.

Homalobus subglaber Rydb. loc. cit.

Astragalus subglaber M. E. Peck, Man. Pl. Oregon 444. 1941.

Perennial, with caespitose caudex, the stems 2–3 dm. high, glabrous or nearly so. Leaves 4–8

cm. long; leaflets 11–25, oblong-obovate to oblanceolate, 5–10 mm. long, 2–5 mm. wide, glabrous above, sparingly short-pubescent beneath, often only on the margins and midrib; peduncles 5–10 cm. long; racemes 3–5 cm. long; calyx villous, the tube 8 mm. long, gibbous on the upper side, the two upper teeth triangular, the three lower lanceolate, 0.5 mm. long; corolla ochroleucous, 14 mm. long; pod arcuate, 12–18 mm. long, 3 mm. wide, sparingly short-pubescent; stipe 8–10 mm. long.

Upper Sonoran Zone; northeastern Oregon. Type locality: John Day River, Oregon. May–June.

Astragalus Laurentii (Rydb.) M. E. Peck, Man. Pl. Oregon 443. 1941. This is apparently only a form of *Astragalus subglaber* with the body of the pod villous, slightly curved and 10–15 mm. long. Known only from the type locality, Heppner, Morrow County, Oregon.

18. *Astragalus speiropárcus* A. Gray. Spiral-pod Rattle-weed. Fig. 2792.

Astragalus speiropárcus A. Gray, Proc. Amer. Acad. 6: 225. 1864.

Phaca speiropárcus Piper, Contr. U.S. Nat. Herb. 11: 370. 1906.

Homalobus speiropárcus Rydb. Bull. Torrey Club 51: 18. 1924.

Perennial, the stems much branched from a slender root, flexuous, 2–3 dm. high, rarely more, the whole plant grayish-strigose. Leaves 5–7 cm. long; leaflets 9–17, oblong-cuneate to oblong-obovate, retuse, 5–12 mm. long; peduncles 4–5 cm. long, shorter than the leaves, nearly equaled by the racemes; flowers spreading; calyx-tube 6–7 mm. long, gibbous at base, the teeth broadly triangular, scarcely 1 mm. long; corolla ochroleucous, 15 mm. long, the banner well exceeding the keel; pods spirally coiled, 3–4 mm. broad, acuminate at apex, gradually narrowed below to a stout stipe, firm, strigose, reticulate.

Dry plains, Upper Sonoran Zone; Yakima and Klickitat Counties, eastern Washington, to Klamath and Lake Counties, eastern Oregon. Type locality: Wenas, Yakima County, Washington. May–June.

19. *Astragalus alvordénsis* M. E. Jones. Alvord Rattle-weed. Fig. 2793.

Astragalus alvordénsis M. E. Jones, Contr. West. Bot. No. 10: 67. 1902.

Homalobus alvordénsis Rydb. Bull. Torrey Club 51: 18. 1924.

Perennial, the stems slender, ascending, much branched, 3–5 dm. high. Leaves 2–4 cm. long; leaflets 13–17, approximate, obovate-cuneate, retuse, 4–6 mm. long, thick, short-pubescent; peduncles slender, 1–2 cm. long; racemes 3–8-flowered; flowers widely spreading; calyx-tube turbinate-campanulate, about 2 mm. long, obliquely inverted at the base, the teeth triangular, minute; corolla 7 mm. long, purple-veined; pod about 2 cm. long, 3 mm. high, flattened, spirally coiled into one or one and one-half coils, firm-coriaceous and pubescent, long-acuminate at apex, narrowed to a slender stipe, about 1 cm. long.

Dry plains and hillsides, Upper Sonoran Zone; known only from Alvord Valley, eastern Oregon. June.

20. *Astragalus sclerocárcus* A. Gray. Woody-pod Rattle-weed. Fig. 2794.

Phaca podocarpa Hook. Fl. Bor. Amer. 1: 142. 1831. Not *Astragalus podocarpus* C. A. Mey. 1831.

Astragalus sclerocárcus A. Gray, Proc. Amer. Acad. 6: 225. 1864.

Homalobus podocarpus Rydb. Bull. Torrey Club 51: 18. 1924.

Perennial, the stems several from the crown of a woody root, rather widely branching, 3–5 dm. high, strigose, but scarcely canescent. Leaves rather sparse, 6–8 cm. long; leaflets 7–14, distant, narrowly linear, 8–15 mm. long, strigose; peduncles 6–8 cm. long; racemes 3–5 cm. long; calyx-tube 6 mm. long, black-hairy, the teeth 1 mm. long; corolla 10 mm. long, white tinged with purple; pods including the stipe 4–5 cm. long, curved only slightly to about one-third of a circle, long-acuminate at apex and tapering at base to the stipe, coriaceous, flat when young, oval in cross-section when mature, reticulate, strigose, dehiscent from the base.

Dry plains, especially in sand, Upper Sonoran Zone; eastern Washington and eastern Oregon, from Ellensburg to the Malheur River. Type locality: Great Falls of the Columbia River. April–May.

21. *Astragalus bicristátus* A. Gray. Crested Rattle-weed. Fig. 2795.

Astragalus bicristatus A. Gray, Proc. Amer. Acad. 19: 75. 1883.

Homalobus bicristatus Rydb. Bull. Torrey Club 51: 19. 1924.

Perennial, the stems much branched, 3–5 dm. high, green and nearly glabrous or more or less cinereous-strigose. Leaves 6–8 cm. long; leaflets 11–15, linear to oblong, 8–20 mm. long, green or more or less cinereous; peduncles exceeding the leaves; racemes 4–5 cm. long; calyx-tube 7 mm. long, the teeth subulate, 3 mm. long; corolla ochroleucous or tinged with purple, 12 mm. long; body of the pod 15–20 mm. long, curved often to one-third circle, rather abruptly narrowed to a prominent beak at apex, glabrous, somewhat obcompressed, broader than deep, the dorsal suture more or less winged; stipe 8–10 mm. long.

Open pine forests and desert slopes, Arid Transition and Upper Sonoran Zones; San Gabriel and San Bernardino Mountains, southern California. Type locality: Holcomb Valley, San Bernardino Mountains. May–June.

22. *Astragalus revéntus* A. Gray. Revenant Locoweed. Fig. 2796.

Astragalus reventus A. Gray, Proc. Amer. Acad. 15: 46. 1879.

Phaca reventa Piper, Contr. U.S. Nat. Herb. 11: 372. 1906.

Cnemidophacos reventus Rydb. Bull. Torrey Club 40: 52. 1913.

Cnemidophacos reventiformis Rydb. N. Amer. Fl. 24: 284. 1929.

Stems erect, 2–4 dm. high, numerous, sparingly strigose. Leaflets 21–37, oblong to linear, 10–15 mm. long, cinereous-strigose on both surfaces or glabrate above; peduncles erect, often 2 dm. long in fruit; racemes 3–5 cm. long; calyx black-hairy, the tube 7–8 mm. long, the teeth

3 mm. long; corolla ochroleucous or white, 2 cm. long; pod erect, ovoid-oblong, acute, 15–20 mm. long, 7–8 mm. wide, thick-walled, glabrous.

Hillsides, Arid Transition Zone; eastern Washington and eastern Oregon to Idaho. Type locality: "Interior of Oregon." May–July.

Cnemidophācos Knowlesiānus Rydb. N. Amer. Fl. 24: 284. 1929. This is a form of *A. reventus*, characterized by its sparsely black-hairy calyx and short-pubescent pods. Klickitat County, Washington, and adjacent Oregon.

23. *Astragalus hoodiānus* Howell. Hood River Locoweed. Fig. 2797.

Astragalus hoodiānus Howell, Erythea 1: 111. 1893.

Perennial from a woody crown, the stems erect, 10–15 cm. high, whole plant canescent with a strigose pubescence. Leaflets 11–15, linear, 5–10 mm. long; peduncles stout, often 2–3 dm. long; racemes loose, 5–8 cm. long; calyx-tube cylindrical, 5 mm. long, the teeth subulate, about equaling the tube; corolla white or ochroleucous, 16–18 mm. long; pod coriaceous, oblong, dorsally compressed, 10–15 mm. long, pubescent.

Dry hillsides, Arid Transition Zone; Hood River, Oregon, to The Dalles, Oregon, and across the Columbia River in adjacent Washington. Type locality: hills along Hood River, Oregon. May–July.

24. *Astragalus iodānthus* S. Wats. Violet Rattle-weed. Fig. 2798.

Astragalus iodanthus S. Wats. Bot. King Expl. 70. 1871.

Tragacantha iodantha Kuntze, Rev. Gen. Pl. 943. 1891.

Xylophacos iodanthus Rydb. Bull. Torrey Club 52: 144. 1925.

Stems several from the woody crown, 1–3 dm. long, spreading or ascending, glabrous. Stipules membranous, erect; leaves 5–7 cm. long; leaflets 13–19, or sometimes fewer, elliptic to broadly oval or obovate, 5–10 mm. long, glabrous or very sparsely strigose; peduncles 3–4 cm. long; fruiting racemes 3–5 cm. long; calyx-tube cylindric, 4 mm. long, black-hairy, teeth subulate, scarcely 2 mm. long; corolla ochroleucous, about 10 mm. long; pods curved into almost a complete circle, 20–25 mm. long, acuminate at apex, abruptly rounded to the sessile base, strongly obcompressed and sulcate, strigose and mottled.

Arid Transition and Upper Sonoran Zones; eastern base of the Sierra Nevada from Honey Lake, California, to Esmeralda County, Nevada. Type locality: near Virginia City, Nevada. May.

25. *Astragalus Cāsei* A. Gray. Case's Rattle-weed. Fig. 2799.

Astragalus Casei A. Gray, Bot. Calif. 1: 154. 1876.

Tragacantha Casei Kuntze, Rev. Gen. Pl. 943. 1891.

Xylophacos Casei Rydb. Bull. Torrey Club 52: 147. 1925.

Stems numerous and freely branching from the woody crown, 2–4 dm. high, strigose and more or less cinereous. Stipules green, reflexed; leaflets 5–11, rather distant, linear, 6–15 mm. long, strigose; peduncles 5–10 cm. long; fruiting racemes 3–10 cm. long; calyx-tube cylindric, 7 mm. long, black-hairy, the teeth subulate, scarcely 2 mm. long; corolla purplish, 12–15 mm. long; pods 4–5 cm. long, more or less arcuate, the acuminate beak upturned and the base declined, 6–8 mm. broad, obcompressed, shallowly sulcate, strigose and rugose-reticulate when mature.

Sagebrush plains and hills, Upper Sonoran Zone; Pyramid Lake, Nevada, to the Panamint Mountains, California. Type locality: "high plateau near Pyramid Lake." April–May.

26. *Astragalus Wébberi* A. Gray. Webber's Rattle-weed. Fig. 2800.

Astragalus Webberi A. Gray, Bot. Calif. 1: 154. 1876.

Xylophacos Webberi Rydb. Bull. Torrey Club 52: 151. 1925.

Stems 15–30 cm. high from a woody crown, strigose. Stipules lanceolate, reflexed; leaves 5–7 cm. long; leaflets 11–21, rather approximate, oblong or obovate-oblong, 10–15 mm. long, densely silvery-canescens with a fine silky pubescence; peduncles surpassing the leaves; raceme short, rather densely 9–20-flowered; calyx-tube cylindric, 7 mm. long, the teeth subulate, about 3 mm. long; corolla ochroleucous, about 12 mm. long; pod 2–3 cm. long, acute at apex, rounded at base, 8–12 mm. wide, obcompressed, shallowly and broadly sulcate, rugosely reticulate, glabrous.

Arid Transition Zone; mountain slopes about Sierra Valley, California. Type locality: Indian and Sierra Valleys, California. July.

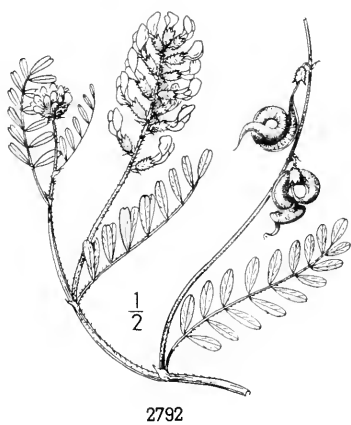
27. *Astragalus Newbérrii* A. Gray. Newberry's Woolly-pod. Fig. 2801.

Astragalus Newberryi A. Gray, Proc. Amer. Acad. 12: 55. 1876.

Xylophacos Newberryi Rydb. Bull. Torrey Club 32: 662. 1906.

Perennial, caespitose, the branches usually less than 1 dm. long. Leaflets 5–7, rarely 9, broadly oblanceolate or obovate, 6–12 mm. long, densely silky with a fine strictly appressed pubescence; peduncles equal to or usually shorter than the leaves; racemes capitate, 5–7-flowered; calyx silky-villous with interspersed black hairs, the tube cylindric, about 10 mm. long, the teeth subulate, 3 mm. long; corolla 20–25 mm. long, tinged with purple, the keels tipped with dark purple; pods densely long-hairy, 2 cm. long and 1.5 cm. wide, ovoid to nearly globose, often somewhat obcompressed, and slightly sulcate at base on both sutures.

Sonoran Zones of the Great Basin Region, Nevada and Wyoming to the eastern edge of California (White and New York Mountains) in the Mojave Desert, Arizona, and New Mexico. Type locality: "On the frontiers of Utah and Arizona." March–May.



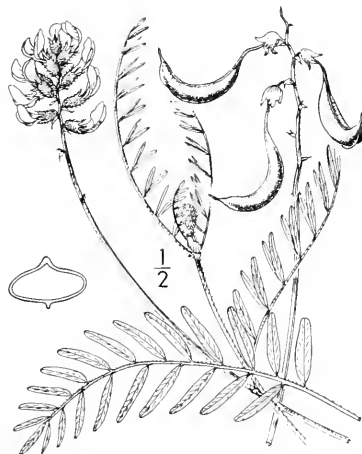
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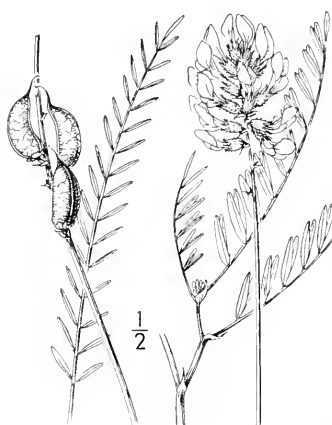
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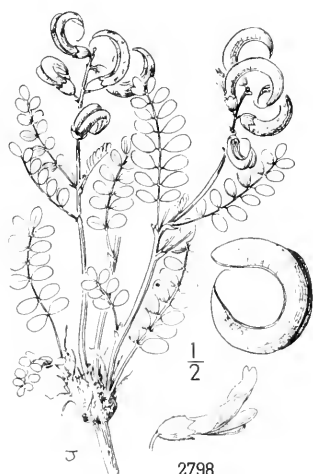
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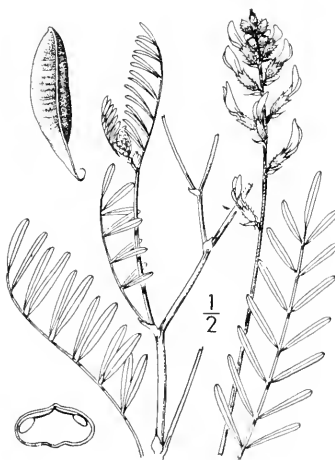
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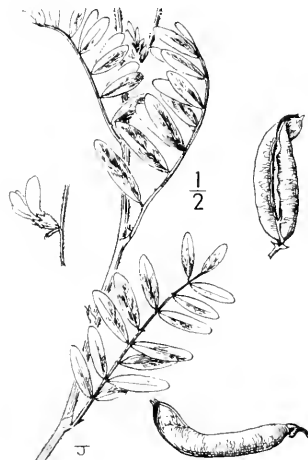
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2792. *Astragalus speirocarpus*
2793. *Astragalus alvordensis*
2794. *Astragalus sclerocarpus*

2795. *Astragalus bicristatus*
2796. *Astragalus revertus*
2797. *Astragalus hoodianus*

2798. *Astragalus iodanthus*
2799. *Astragalus Casei*
2800. *Astragalus Webberi*

28. *Astragalus inflexus* Dougl. Grooved Woolly-pod. Fig. 2802.

Astragalus inflexus Dougl. ex Hook. Fl. Bor. Amer. 1: 151. 1834.

Phaca inflexa Piper, Contr. U.S. Nat. Herb. 11: 369. 1906.

Xylophacos inflexus Rydb. Bull. Torrey Club 40: 49. 1913.

Perennial, the stems several, decumbent, 2–4 dm. long, whole plant hoary with a dense long-villous pubescence. Leaflets 15–25 mm. long, elliptic to oblanceolate; raceme subcapitate, 5–10-flowered; calyx-tube 10–12 mm. long, the teeth subulate, 6–7 mm. long; corolla light purple, 20–25 mm. long; pod oblong-ovoid, 20–25 mm. long, curved, deeply sulcate on both sutures, villous.

Dry plains and hills, especially sandy soil, Upper Sonoran Zone; southeastern Washington and northeastern Oregon to Montana. Type locality: "On the barren sandy grounds of the Columbia from the junction of Lewis and Clark [Snake] River to the [Blue] mountains." May–June.

29. *Astragalus incurvus* (Rydb.) Abrams. Curved Woolly-pod. Fig. 2803.

Xylophacos incurvus Rydb. Bull. Torrey Club 52: 366. 1925.

Astragalus Purshii var. *longilobus* M. E. Jones, Zoe 4: 269, in part. 1893.

Astragalus Purshii var. *incurvus* Jepson, Fl. Calif. 2: 360. 1936.

Perennial, caespitose, the stems seldom over 5 cm. long, whole plant densely white-villous. Leaflets 11–17, elliptic to oblanceolate, acute, 8–15 mm. long; peduncles 3–5 cm. long; racemes subcapitate, 3–5-flowered; calyx-tube about 1 cm. long, white-villous, the teeth subulate, 5–7 mm. long; corolla about 2 cm. long, white or faintly tinged with rose-purple, the keel purple-tipped; pod densely hairy, 2 cm. long, 1 cm. wide, usually sulcate on both sutures, strongly incurved almost to a half circle.

Usually in gravelly somewhat alkaline soils, Arid Transition and Upper Sonoran Zones; western Nevada and California east of the Sierra Nevada. Type locality: California. April–June.

30. *Astragalus funereus* M. E. Jones. Black Woolly-pod. Fig. 2804.

Astragalus funereus M. E. Jones, Contr. West. Bot. No. 12: 11. 1908.

Xylophacos funereus Rydb. Bull. Torrey Club 52: 367. 1925.

Xylophacos Blyae Rose, N. Amer. Fl. 24: 303. 1929.

Astragalus Purshii var. *funereus* Jepson, Fl. Calif. 2: 360. 1936.

Perennial, caespitose, the stems usually less than 1 dm. long, whole plant densely villous with tangled hairs. Leaflets 13–17, oval to obovate, obtuse at the apex, 5–8 mm. long; peduncles stout; racemes subcapitate, 3–10-flowered; calyx-tube 7–8 mm. long, black-hairy, the teeth subulate, about 3 mm. long; corolla rose-purple, becoming bluish when dry, 15–20 mm. long; pods densely hairy, about 5 cm. long, 1.5 cm. wide, ovoid, somewhat obcompressed at base, slightly curved, hooked at the apex, upper suture slightly sulcate.

Clay soils, Lower Sonoran Zone; Mojave Desert of southern Nevada, northwestern Arizona, and eastern borders of California. Type locality: Rhyolite, Nevada. March–April.

31. *Astragalus utahensis* (Torr.) Torr. & Gray. Utah Woolly-pod or Pink Lady-fingers. Fig. 2805.

Phaca mollissima var. *utahensis* Torr. in Stansbury's Exp. 385. pl. 2. 1853.

Astragalus utahensis Torr. & Gray, Pacif. R. Rep. 2: 120. 1856.

Xylophacos utahensis Rydb. Bull. Torrey Club 40: 49. 1913.

Xylophacos subvillosus Rydb. Bull. Torrey Club 52: 368. 1925.

Perennial, caespitose, the stems usually less than 1 dm. long, the whole plant densely white-woolly. Leaflets 9–17, obovate, often broadly so, rounded at the apex, 5–10 mm. long; peduncles mostly shorter than the leaves; racemes subcapitate, 3–10-flowered; calyx-tube about 12 mm. long, the teeth subulate, about 4 mm. long; corolla 25–30 mm. long, violet-purple; pod ovoid, about 2 cm. long, slightly curved, slightly sulcate on both sutures, densely hirsute-villous.

Hills and bench-lands, Upper Sonoran and Arid Transition Zones of the Great Basin region; Harney County, eastern Oregon, and northern Sierra Nevada, California, to Montana, Wyoming, and Utah. Type locality: northeast shore of Great Salt Lake and on Stansbury Island. April–May.

Astragalus nudisiliquus A. Nels. Bot. Gaz. 54: 410. 1912. Closely resembles *A. utahensis*, but the pod sparingly instead of densely woolly, and the flowers ochroleucous or white instead of rose-purple. Found in Elmore County, Idaho, and Malheur County, Oregon.

32. *Astragalus Purshii* Dougl. Pursh's Woolly-pod or Sheep-pod. Fig. 2806.

Astragalus Purshii Dougl. ex Hook. Fl. Bor. Amer. 1: 152. 1830.

Astragalus mollissima Nutt. in Torr. & Gray, Fl. N. Amer. 1: 350. 1838.

Phaca Purshii Piper, Contr. U.S. Nat. Herb. 11: 369. 1906.

Xylophacos Purshii Rydb. Bull. Torrey Club 32: 662. 1906.

Perennial, caespitose, the stems usually less than 5 cm. long, whole plant densely white-villous. Leaflets 9–13, oblong to oblanceolate, acutish, 8–15 mm. long; calyx-tube 10 mm. long, the teeth subulate, about 3 mm. long; corolla 20–25 mm. long, ochroleucous, the keel tipped with dark purple; pod ovoid, densely villous, 15–20 mm. long, slightly curved and scarcely sulcate.

Dry hillsides and plains, Upper Sonoran and Arid Transition Zones; British Columbia to South Dakota, south to eastern Washington and Oregon and Nevada. Type locality: "On low hills of the Spokane River," Washington. May–June.

33. *Astragalus glareosus* Dougl. Gravel Woolly-pod. Fig. 2807.

Astragalus glareosus Dougl. ex Hook. Fl. Bor. Amer. 1: 152. 1831.

Astragalus allanaris Sheldon, Minn. Bot. Studies 1: 141. 1894.

Astragalus inflexus var. *glareosus* M. E. Jones, Contr. West. Bot. No. 10: 62. 1902.

Phaca glareosa Piper, Contr. U.S. Nat. Herb. 11: 369. 1906.

Xylophacos glareosus Rydb. Fl. Rocky Mts. 506, 1063. 1917.

Perennial, caespitose, decumbent, usually less than 1 dm. long, the whole plant canescent-hirsute. Leaflets 11–17, oblong, acute, 4–10 mm. long; peduncles very short; flowers 3–8, subcapitate; calyx-tube 8–9 mm. long, the teeth subulate, 2 mm. long; corolla purple, about 2 cm. long; pod ovoid, 20–25 cm. long, villous.

Dry hills and plains, mainly Arid Transition Zone; British Columbia and eastern Washington to eastern Oregon, Montana, and Wyoming. Type locality: "Plentiful on dry, gravelly banks of rivers, from the confluence of the Lewis and Clark's [Snake] River with the Columbia to the [Blue] mountains." May–June.

Astragalus ventosus Suksdorf ex Rydb. Bull. Torrey Club 52: 370. 1925. Closely related to *Astragalus glareosus* Dougl., from which it is distinguished by its black-hairy calyx and broader leaflets, which are elliptical, obtuse, 5–7 mm. long and 2–3 mm. wide. Known only from the type locality: "Windy rocky places, several kilos east of Bingen," Washington.

34. *Astragalus candelarius* Sheldon. Candelaria Woolly-pod. Fig. 2808.

Astragalus Purshii var. *tinctus* M. E. Jones, Zoe 4: 269. 1893.

Astragalus candelarius Sheldon, Minn. Bot. Studies 1: 143. 1894.

Xylophacos candelarius Rydb. Bull. Torrey Club 52: 370. 1925.

Perennial, caespitose, the stems usually less than 1 dm. long, whole plant cinereous-villous. Leaflets 5–9, elliptic to narrowly obovate, obtuse or rounded at apex, 6–12 mm. long; peduncles usually exceeding the leaves; racemes 3–7-flowered; calyx-tube 8 mm. long, the teeth subulate, about 3 mm. long; corolla purple, 20 mm. long; pods broadly ovoid, slightly curved, very densely hairy, scarcely sulcate.

Dry hills and plains, Upper Sonoran and Arid Transition Zone; Wheeler County, eastern Oregon, to north-eastern California and Esmeralda County, Nevada. Type locality: near Candelaria, Esmeralda County, Nevada. April–May.

35. *Astragalus leucolobus* S. Wats. Bear Valley Woolly-pod. Fig. 2809.

Astragalus leucolobus S. Wats. ex M. E. Jones, Zoe 4: 270. 1893.

Astragalus Purshii var. *leucolobus* M. E. Jones, Contr. West. Bot. No. 10: 61. 1902.

Xylophacos leucolobus Rydb. Bull. Torrey Club 52: 371. 1925.

Perennial, caespitose, the stems seldom over 5 cm. long, whole plant densely white-villous. Leaflets mostly 15–17, elliptic to oblanceolate, acute, 6–8 mm. long; peduncles about equaling or usually well exceeding the leaves; racemes subcapitate to 3 cm. long, 3–10-flowered; calyx-tube 7–8 mm. long, about 3.5 mm. wide, white-villous, the teeth subulate, about 2.5 mm. long; corolla 18–20 mm. long, purple or rose-purple.

Mountain slopes, Arid Transition Zone; southern California in the Panamint Mountains, and in the San Gabriel Range south to the Santa Rosa Mountains. Type locality: mountain slopes, Bear Valley, San Bernardino Mountains, 6,500 feet altitude. May–June.

Astragalus leucolobus subsp. *conséctus* (Sheldon) Abrams. (*Astragalus conséctus* Sheldon, Minn. Bot. Studies 1: 143. 1894; *Xylophacos conséctus* Rydb. N. Amer. Fl. 24: 306. 1929; *Astragalus leucolobus* var. *subvestitus* Jepson, Fl. Calif. 2: 361. 1936.) Caespitose perennial, the stems 3–6 cm. long, densely woolly with long white hairs. Leaflets 11–25, oblong to oval, 5–8 mm. long, densely and loosely villous; peduncles 3–6 cm. long; bracts 4–5 mm. long, lanceolate; racemes 5–8-flowered; calyx loosely white-villous, the tube 7–8 mm. long, the teeth subulate, 3 mm. long; corolla purple, 15–18 mm. long; pod densely villous, 2 cm. long, arcuate, gradually acute. Dry gravelly hillsides, Upper Sonoran Zone; Tehachapi Mountains and the adjacent sections of the southern Sierra Nevada and Coast Ranges, California. This subspecies has been considered by some as a distinct species; the long woolly pubescence and the shorter peduncles are its principal distinguishing characters. Type locality: Tejon Pass, California. May–June.

36. *Astragalus Jónesii* Abrams. Silver Woolly-pod. Fig. 2810.

Xylophacos argentinus Rydb. Bull. Torrey Club 52: 371. 1925. Not *Astragalus argentinus* Mang.

Perennial, caespitose, whole plant silvery with a dense woolly pubescence, the stems less than 5 cm. long. Leaflets 7–13, broadly obovate, about 1 cm. long, rounded at apex; peduncles 3–5 cm. long; racemes 2–5-flowered; calyx-tube 5–6 mm. long, white-villous, the teeth subulate, 2–3 mm. long; corolla ochroleucous, 13–14 mm. long; pod densely white-villous, 2 cm. long, 8 mm. deep, acutish above the middle, the sutures slightly sulcate.

Sandy or gravelly soils, Upper Sonoran Zone; Desert Ranges, Inyo and eastern San Bernardino Counties, California. Type locality: Lone Pine, California. April–June.

37. *Astragalus lectulus* S. Wats. Purple Woolly-pod or Sheep-pod. Fig. 2811.

Astragalus lectulus S. Wats. Proc. Amer. Acad. 22: 471. 1887.

Astragalus Purshii var. *lectulus* M. E. Jones, Contr. West. Bot. No. 10: 61. 1902.

Xylophacos lectulus Rydb. Bull. Torrey Club 52: 371. 1925.

Xylophacos lagopinus Rydb. Bull. Torrey Club 52: 372. 1925.

Astragalus varius Eastw. Leaflets West. Bot. 1: 178. 1935.

Perennial, caespitose, the stems less than 5 cm. long, whole plant densely white-woolly. Leaves 3–5 cm. long; leaflets 3–9, oblanceolate to elliptic, 6–10 mm. long, acute or obtuse; peduncles much shorter than the leaves; racemes subcapitate, mostly 3–5-flowered; calyx-tube 4–5 mm.

long, white-villous, the teeth subulate, scarcely 2 mm. long; corolla purple, about 12 mm. long; pod ovoid, about 7 mm. long, densely white-woolly.

Gravelly flats, Arid Transition Zones; eastern Oregon, Crook County, to the San Bernardino Mountains, California. Type locality: Bear Valley, San Bernardino Mountains, altitude, 6,000 feet. June–Aug.

38. *Astragalus coccineus* (Parry) Brandg. Crimson Woolly-pod or Sheep-pod. Fig. 2812.

Astragalus Purshii var. *coccineus* Parry, W. Amer. Sci. 7: 10. 1890.

Astragalus coccineus Brandg. Zoe 2: 72. 1890.

Xylophacos coccineus Heller, Muhlenbergia 2: 217. 1906.

Perennial, caespitose, the stems less than 5 cm. long, whole plant densely white-woolly. Leaves 6–10 cm. long; leaflets 9–15, elliptic to obovate, obtuse or rounded, 6–12 mm. long; peduncles usually a little shorter than the leaves; racemes subcapitate, mostly 3–6-flowered; calyx-tube 15 mm. long, 4 mm. wide, the teeth subulate, 3–4 mm. long, white-villous; corolla bright crimson, 25 mm. long, the keel nearly straight, the standard reflexed; pods oblong, about 35 mm. long, 10 mm. wide, slightly curved, densely villous.

Sandy or stony ground, Upper Sonoran Zone; Desert Ranges, from Inyo County, California, to northern Lower California. Type locality: eastern slope of the mountains bordering the Colorado Desert, San Diego County. April–May.

39. *Astragalus cinerascens* (Rydb.) Tidestrom. Winged Locoweed. Fig. 2813.

Pterophacos cinerascens Rydb. N. Amer. Fl. 24: 309. 1929.

Astragalus cinerascens Tidestrom, Proc. Biol. Soc. Wash. 50: 21. 1937.

Stems from a caespitose woody caudex, 1–2 dm. high, slender, branched, strigose-canescens. Leaves spreading; leaflets 7–11, linear, 5–8 mm. long, acute, stiff, strigose-canescens; peduncles 2–6 cm. long; racemes 2–4 cm. long, few-flowered; calyx-tube 4 mm. long, black-hairy; teeth deltoid, 1 mm. long; corolla purplish, 12–14 mm. long; pod strongly falcate, 15–20 mm. long, 6 mm. wide, prominently 4-winged, shiny beneath the sparse strigose pubescence.

Dry sandy hillsides, Upper Sonoran Zone; eastern Oregon. Type locality: dry sandy bluffs southwest of Narrows, Harney County, Oregon. May–July.

40. *Astragalus oxyphysus* A. Gray. Diablo Locoweed. Fig. 2814.

Astragalus oxyphysus A. Gray, Proc. Amer. Acad. 6: 218. 1864.

Phaca oxyphyssa Heller, Muhlenbergia 2: 86. 1905.

Perennial, densely soft silky-pubescent, the stems branching from the woody base, erect or ascending, about 5–6 dm. high. Leaflets 4–10 pairs, narrowly elliptic to oblong, 1–2 cm. long; racemes 6–15 cm. long; calyx-tube tubular, 6 mm. long, the teeth subulate, about 2 mm. long; corolla greenish white, 15 mm. long; pods about 25 mm. long, clavate-obovoid, tapering at base to the stipe; stipe becoming recurved, about 5 mm. long.

Dry hillsides and plains, Upper Sonoran Zone; Inner Coast Range and San Joaquin Valley, California. Type locality: Mount Diablo Range, Arroyo del Puerto. April–May.

41. *Astragalus asymmétricus* Sheldon. San Joaquin Locoweed. Fig. 2815.

Astragalus leucophyllus Torr. & Gray, Fl. N. Amer. 1: 336. 1838. Not Willd. 1800.

Phaca leucophylla Hook. & Arn. Bot. Beechey 333. 1840.

Astragalus asymmetricus Sheldon, Minn. Bot. Studies 1: 23. 1894.

Astragalus leucopsis var. *asymmetricus* M. E. Jones, Contr. West. Bot. No. 10: 62. 1902.

Perennial, hoary with a dense silky pubescence, or in age nearly canescens, the stems several, flexuous from a somewhat woody base, 5–10 dm. high. Stipules triangular-subulate; leaflets 14–18 pairs, linear-oblong, 15–20 mm. long; raceme 5–8 cm. long; calyx-tube broadly tubular, 5–6 mm. long, the teeth subulate, 2 mm. long; corolla white tinged with green and yellow; pod much inflated, thin and bladdery, 3–4 cm. long, about 2 cm. wide and nearly as thick, obtuse at apex, abruptly contracted at base; stipe 2–4 cm. long, recurved, pubescent.

Dry hillsides and plains, Upper and Lower Sonoran Zones; Lower Sacramento Valley and San Joaquin Valley to Monterey and San Luis Obispo Counties, California. Type locality: originally collected by Douglas, presumably on his journey from Monterey to Santa Barbara. April–July.

42. *Astragalus leucopsis* Torr. & Gray. Southern California Locoweed. Fig. 2816.

Phaca canescens Nutt. in Torr. & Gray, Fl. N. Amer. 1: 344. 1838. Not *Astragalus canescens* DC. 1802.

Phaca leucopsis Torr. & Gray, Fl. N. Amer. 1: 694. 1840.

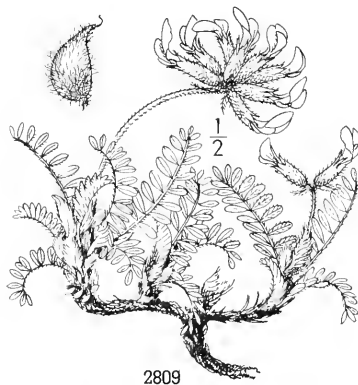
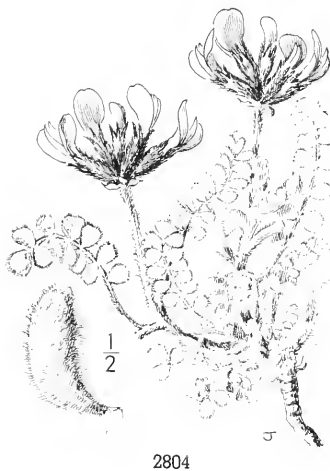
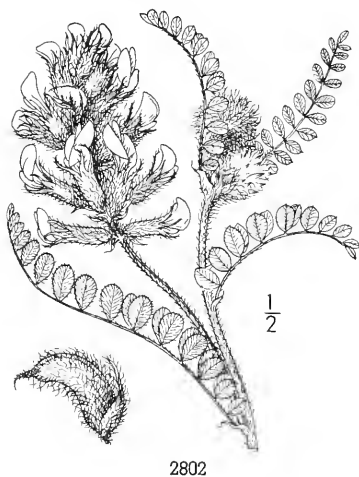
Astragalus leucopsis Torr. Bot. Mex. Bound. 56. pl. 16. 1859.

Tragacantha leucopsis Kuntze, Rev. Gen. Pl. 946. 1891.

Phaca encenadae Rydb. N. Amer. Fl. 24: 336. 1929.

Perennial, tomentulose-canescens throughout, the stems branching from the somewhat woody base, 3–5 dm. high. Leaflets 10–15 pairs, oval or oblong, obtuse, 1 cm. long or more; racemes dense, 4–6 cm. long; calyx-tube narrowly campanulate, 4 mm. long, hyaline, the teeth subulate, 2–3 mm. long; corolla greenish white, 12 mm. long; pod thin, bladdery, strigose, half-oval, 2–3 cm. long, abruptly narrowed to a stipe, mostly 8–12 mm. long.

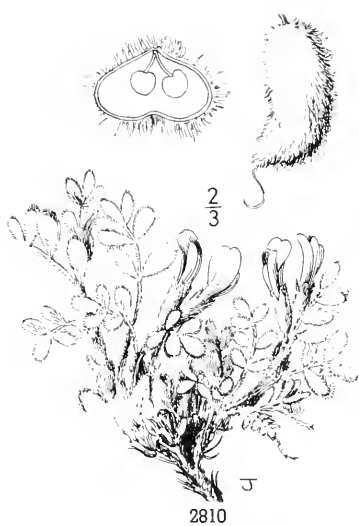
Hillsides and plains, Upper and Lower Sonoran Zones; Santa Barbara, California, to northern Lower California. Type locality: dry plains, Santa Barbara, California. March–June. A form (*Phaca encenadae* Rydb.) found in northern Lower California and occasionally in San Diego County, California, has glabrous pods.



2801. *Astragalus Newberryi*
2802. *Astragalus inflexus*
2803. *Astragalus incurvus*

2804. *Astragalus funereus*
2805. *Astragalus utahensis*
2806. *Astragalus Purshii*

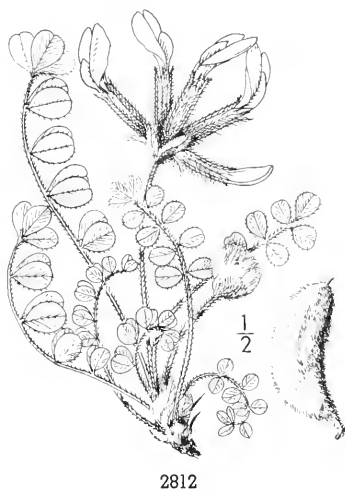
2807. *Astragalus glareosus*
2808. *Astragalus candelarius*
2809. *Astragalus leucolobus*



2810



2811



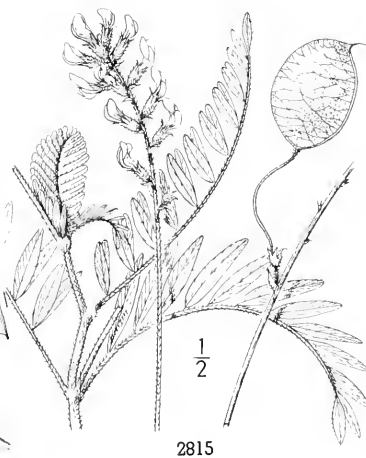
2812



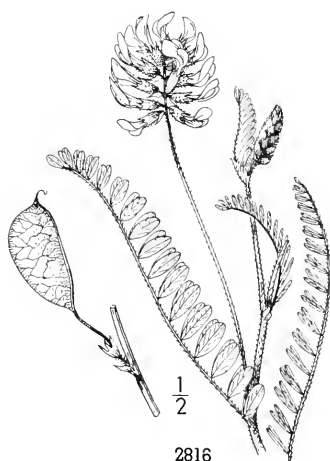
2813



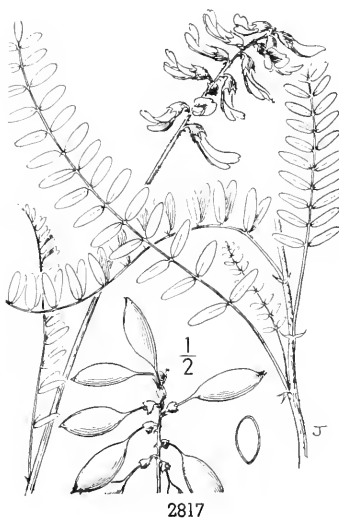
2814



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2810. *Astragalus Jonesii*
 2811. *Astragalus lectulus*
 2812. *Astragalus coccineus*

2813. *Astragalus cinerascens*
 2814. *Astragalus oxyphysus*
 2815. *Astragalus asymmetricus*

2816. *Astragalus leucopsis*
 2817. *Astragalus trichopodus*
 2818. *Astragalus Cusickii*

43. *Astragalus trichopodus* (Nutt.) A. Gray. Santa Barbara Locoweed.

Fig. 2817.

Phaca trichopoda Nutt. in Torr. & Gray, Fl. N. Amer. 1: 343. 1838.*Astragalus trichopodus* A. Gray, Proc. Amer. Acad. 6: 218. 1864.*Tragacantha trichopoda* Kuntze, Rev. Gen. Pl. 948. 1891.

Perennial, the stems usually several, erect or ascending, 30–50 cm. high, herbage grayish-strigose when young, becoming greener and glabrate with age. Leaves 10–15 cm. long, the rachis slender; leaflets 25–33, linear-oblong, 8–18 mm. long, 3–6 mm. wide; peduncles exceeding the leaves; flowers numerous, reflexed on short pedicels; calyx-tube campanulate, 3 mm. long, black-hairy, the teeth triangular-subulate, scarcely 1 mm. long; corolla ochroleucous, 12 mm. long, the banner arched upward nearly to the tip; pod 20–25 mm. long, 7–10 mm. high, upper suture convex, oval in cross-section, acutish at both ends; stipe 8–15 mm. long.

Dry hillsides, Upper Sonoran Zone; cismontane region, southern California, Santa Barbara to Orange County. Type locality: "Borders of woods near the sea," Santa Barbara, California. April–May.

Astragalus trichopodus var. *capillipes* (M. E. Jones) Munz & McBurney, Bull. S. Calif. Acad. 31: 67. 1932. Pod more compressed than in the species; upper suture straight or somewhat concave. Santa Catalina Island, California.

44. *Astragalus Cusickii* A. Gray. Cusick's Locoweed. Fig. 2818.*Astragalus Cusickii* A. Gray, Proc. Amer. Acad. 13: 370. 1878.*Phaca Cusickii* Rydb. Bull. Torrey Club 40: 47. 1913.

Perennial, the stems tufted, erect, 3–6 dm. high, slender, broom-like, very sparsely strigose. Stipules small, subulate; leaves 6–10 cm. long; leaflets remote, mostly scattered, narrowly linear to filiform, 3–25 mm. long, deciduous; peduncles exceeding the leaves; flowers loosely racemose, ochroleucous; calyx-tube campanulate, 4 mm. long, the teeth triangular, scarcely 1 mm. long; corolla 12–15 mm. long, the banner well exceeding the keel; pods elliptic to obovate, about 3 cm. long, narrowed at the base to a short (2–4 mm.) stipe, translucent, lined and penciled with reddish purple.

Dry rocky ridges, Upper Sonoran Zone; northeastern Oregon and adjacent Idaho. Type locality: Union County, Oregon. April–May.

45. *Astragalus curtipes* A. Gray. San Luis Locoweed. Fig. 2819.*Astragalus curtipes* A. Gray, Proc. Amer. Acad. 6: 218. 1864.*Tragacantha curtipes* Kuntze, Rev. Gen. Pl. 944. 1891.*Astragalus leucopsis* var. *curtipes* Jones, Contr. West. Bot. No. 10: 62. 1902.

Perennial, woody at base, cinereous with minute appressed hairs, or green with age, the stems stout, 3–6 dm. high. Stipules hyaline, conspicuous, connate opposite the petioles; leaflets narrowly oblong, 10–15 pairs; racemes rather short and dense; calyx-tube campanulate, 4 mm. long, the teeth scarcely equaling the tube; corolla white, 8–10 mm. long, soon reflexed; pods half-oval, 3–4 cm. long, 2 cm. thick, sulcate on the upper suture, abruptly contracted at base to the short stipe, which about equals the calyx.

Dry hillsides, Upper Sonoran Zone; vicinity of San Luis Obispo, California. Type locality: San Luis Obispo, on dry hillsides. April–June.

46. *Astragalus oophorus* S. Wats. Spindle Locoweed. Fig. 2820.*Astragalus oophorus* S. Wats. Bot. King Expl. 73. 1871.*Phaca jucunda* Jepson & Rydb. N. Amer. Fl. 24: 339. 1929.

Cespitose perennial, glabrous throughout, the stems decumbent at the base, 2–4 dm. high. Leaves 10–15 cm. long; stipules broadly deltoid, 5–8 mm. long; leaflets 11–19, oval to obovate, 5–20 mm. long, usually retuse at the apex; peduncles 7–15 cm. long; racemes 3–7 cm. long; calyx-tube campanulate, 5 mm. long, the lobes lanceolate-subulate, 4 mm. long; corolla purple, at least the banner, 15–18 mm. long; pod ellipsoid, more or less mottled, 4 cm. long and 2 cm. wide, acutish at each end, the stipe little exceeding the calyx-tube.

Desert ranges, Upper Sonoran Zone; Nevada and Utah south to the White and Panamint Mountains, California, and northern Arizona. Type locality: Reese River Pass of the Shoshone Mountains, Nevada. May–June.

47. *Astragalus nutans* M. E. Jones. Providence Mountain Rattle-weed.

Fig. 2821.

Astragalus nutans M. E. Jones, Rev. N. Amer. Astrag. 108. 1923.*Astragalus deserticolus* Jepson, Man. Fl. Pl. Calif. 565. 1925.

Slender perennial or biennial, canescent throughout with closely appressed hairs, the stems several, slender, branching throughout, 1–3 dm. long. Leaves 2–5 cm. long; leaflets 7–13, narrowly elliptic to linear, 6–12 mm. long; peduncles shorter than or exceeding the leaves; racemes loosely few-flowered; pedicels 2–4 mm. long in fruit; calyx 3 mm. long, the teeth triangular, about 1 mm. long; corolla purple, about 1 cm. long, the banner with a white spot and purple veins; pod nearly globose, 15–20 mm. long, 10–12 mm. wide, thin and papery, penciled with purple, rounded at base; stipe short, 2 mm. long or less.

Desert sands, Lower Sonoran Zone; Providence Mountains and adjacent ranges, eastern Mojave Desert, California. Type locality: Providence Mountains. May.

48. *Astragalus Whitneyi* A. Gray. Whitney's Locoweed. Fig. 2822.

Astragalus Whitneyi A. Gray, Proc. Amer. Acad. 6: 526. 1865.

Astragalus Hookerianus var. *Whitneyi* M. E. Jones, Proc. Calif. Acad. II. 5: 668. 1895.

Phaca Whitneyi Heller, Muhlenbergia 9: 67. 1913.

Phaca lenophylla Rydb. N. Amer. Fl. 24: 341. 1929.

Astragalus violaceus St. John, Research Stud. St. Coll. Wash. 1: 98. 1929.

Perennial, with a deep taproot and caespitose caudex, the flowering stems 1–2 dm. long, decumbent, cinereous. Leaflets 13–19, oblong, 5–10 mm. long, strigose-canescens on both sides; racemes short, few-flowered; calyx-tube 3–4 mm. long, more or less black-hairy, the teeth subulate, 2 mm. long; corolla ochroleucous or pale purple, 8–10 mm. long; pod 15–30 mm. long, obovoid, mottled, the stipe about equaling the calyx.

Dry slopes and ridges, Boreal Zones; Sierra Nevada and high desert ranges of southeastern California and western Nevada. Type locality: near Sonora Pass, Sierra Nevada, California. July–Sept.

Astragalus Whitneyi subsp. *pinosus* (Elmer) Abrams. (*A. Whitneyi* var. *pinosus* Elmer, Bot. Gaz. 39: 54. 1905.) Leaflets sparsely strigose; pods glabrous, conspicuously mottled. Mount Pinos, southern California.

Astragalus Whitneyi subsp. *Hookerianus* (Torr. & Gray) Abrams. (*Phaca Hookeriana* Torr. & Gray, Fl. N. Amer. 1: 693. 1840; *Astragalus Sonneanus* Greene, Pittonia 3: 186. 1897.) Leaflets canescent; pods 2–3.5 cm. long, strigose. Eastern Washington to northeastern California, Idaho, and Colorado. This subspecies as here treated is variable and may include two or three geographic variations worthy of subspecific rank. The plants of northeastern California and adjacent Oregon have more flowers in the racemes, larger corollas and pods.

Astragalus Whitneyi subsp. *siskiyouensis* (Rydb.) Abrams. (*Phaca siskiyouensis* Rydb. N. Amer. Fl. 24: 340. 1929.) Leaflets 10–15 mm. long, sparsely strigose or nearly glabrous. Stems often 2 dm. long; racemes lax, 4–7-flowered; corolla 8–9 mm. long; pods 3–4.5 cm. long, glabrous. Trinity Mountains, California. Type locality: Mount Eddy, Siskiyou County, California.

49. *Astragalus oocarpus* A. Gray. San Diego Rattle-weed. Fig. 2823.

Astragalus oocarpus A. Gray, Proc. Amer. Acad. 6: 213. 1864.

Phaca oocarpha Rydb. N. Amer. Fl. 24: 343. 1929.

Perennial, with flexuous spreading branches 6–8 dm. long, glabrous or the nascent parts sparsely strigose. Stipules deflexed; leaflets 17–23, oblong to broadly linear, 10–20 mm. long, obtuse, green and thickish; racemes loosely many-flowered; calyx campanulate, the tube 3 mm. long, the teeth short, triangular; corolla 8–10 mm. long, creamy white, the keel much incurved, standard longer than the wings, the sides reflexed; pod erect, glabrous, inflated but firm, 2 cm. long, 1 cm. wide, narrowed but sessile at base, distinctly pointed at apex.

Alkaline soils, Sonoran Zones; San Diego County, California. Type locality: mountains east of San Diego. April–June.

50. *Astragalus Parishii* A. Gray. Parish's Locoweed. Fig. 2824.

Astragalus Parishii A. Gray, Proc. Amer. Acad. 19: 75. 1883.

Phaca vallicola Rydb. N. Amer. Fl. 24: 343. 1929.

Phaca pseudocarpha Rydb. N. Amer. Fl. 24: 343. 1929.

Astragalus Douglasii var. *Parishii* M. E. Jones, Contr. West. Bot. No. 8: 6. 1898.

Perennial, stems rather stout, ascending from a decumbent base, 5–10 dm. high, sparingly strigose or glabrous. Leaflets 11–25, oblong to elliptic-obovate, 10–25 mm. long, obtuse to retuse, sparsely strigose-canescens, the tube 4 mm. long, the teeth triangular-lanceolate, 1–1.5 mm. long; flowers pale yellow, 8–10 mm. long, the banner strongly reflexed; pod sessile, strigose, papery, broadly ellipsoid, 4–5 cm. long.

Hillsides and gravelly flats, Upper Sonoran and Arid Transition Zones; San Gabriel Mountains, southern California, to northern Lower California. Type locality: San Jacinto Mountains, southern California. April–Aug.

Astragalus Parishii subsp. *perstrictus* (Rydb.) Abrams. (*Phaca perstricta* Rydb. N. Amer. Fl. 24: 344. 1929.) Pods longer than the species, 5–6 cm. long. San Diego County, California.

51. *Astragalus Peirsonii* Munz & McBurney. Peirson's Locoweed. Fig. 2825.

Astragalus Peirsonii Munz & McBurney, Bull. S. Calif. Acad. 31: 67. 1932.

Annual, densely white-strigose throughout, the stems erect, 3–6 dm. high, with a few erect branches. Leaves 5–9 cm. long, with a flattened rachis; leaflets 9–13, oblong or oblong-linear, 2–6 mm. long; peduncles 6–10 cm. long; flowers in short racemes; calyx-tube 3–4 mm. long, the teeth lanceolate-subulate, 1–1.5 mm. long; corolla rose-purple, 10–12 mm. long; pod 20–25 mm. long, 15 mm. wide, membranous, stramineous and appressed-pubescent.

Desert sand dunes, Lower Sonoran Zone; Colorado Desert, Imperial County, California. Type locality: sand dunes between Holtville, California, and Yuma, Arizona. March–April.

52. *Astragalus Douglasii* (Torr. & Gray) A. Gray. Douglas' Rattle-weed. Fig. 2826.

Phaca Douglasii Torr. & Gray, Fl. N. Amer. 1: 346. 1838.

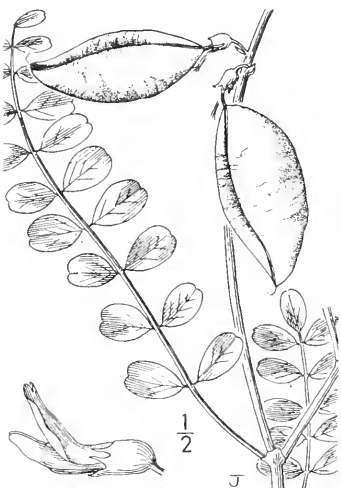
Astragalus Douglasii A. Gray, Proc. Amer. Acad. 6: 215. 1864.

Astragalus tejonensis M. E. Jones, Proc. Calif. Acad. II. 5: 644. 1895.

Perennial, the stems several to many, decumbent, 5–8 dm. long. Stipules 3–4 mm. long, triangular-subulate; leaflets 19–27, narrowly elliptic to linear-oblong, obtuse, 1–2 cm. long, rather thick, green and glabrous except for a sparse appressed strigose-pubescence beneath on the midrib and margins; peduncles about equaling the leaves; racemes loosely few-flowered; calyx-tube campanulate, the teeth triangular-subulate, a little shorter than the tube; corolla cream-yellow,



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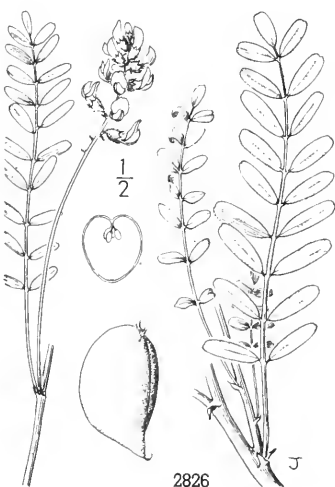
2823



2824



2825



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2819. *Astragalus curtipes*
2820. *Astragalus oophorus*
2821. *Astragalus nutans*

2822. *Astragalus Whitneyi*
2823. *Astragalus oocarpus*
2824. *Astragalus Parishii*

2825. *Astragalus Peirsonii*
2826. *Astragalus Douglasii*
2827. *Astragalus macrodon*

7–8 mm. long, banner well exceeding the keel, strongly arched beyond the calyx; pod half-ovoid, 2.5–3.5 cm. long, about 2 cm. wide, the upper suture somewhat intruding.

Dry hillsides and mesas, Upper Sonoran and Transition Zones; Coast Ranges, Monterey and San Luis Obispo Counties, to the Tehachapi Mountains, California. Type locality: originally collected by Douglas, probably on his excursion from Monterey to Santa Barbara. March–May.

Astragalus Douglasii var. *megalophyus* (Rydb.) Munz & McBurney, Bull. S. Calif. Acad. 31: 65. 1932. (*Phaca megalophysa* Rydb. N. Amer. Fl. 24: 344. 1929.) Resembling the typical species in general habit and calyx characters but corolla 10 mm. long and pods 5–6 cm. long. Desert slopes of the San Gabriel Mountains, southern California.

53. *Astragalus macrodon* (Hook. & Arn.) A. Gray. Salinas Rattle-weed.

Fig. 2827.

Phaca macrodon Hook. & Arn. Bot. Beechey 333. 1841.

Astragalus macrodon A. Gray, Proc. Amer. Acad. 6: 216. 1864.

Astragalus holosericeus M. E. Jones, Proc. Calif. Acad. II. 5: 638. 1895.

Perennial, the stems branched at the base, 3–6 dm. high, herbage densely villous-pubescent. Stipules distinct, lanceolate-subulate, reflexed; leaflets more or less distinct, 17–23, linear or linear-oblong, 1–2 cm. long, acute; racemes rather loosely flowered; flowers soon reflexed; calyx-tube campanulate, 4–5 mm. long, the teeth subulate equaling the tube; corolla yellowish white, 8 mm. long, the banner and the keel strongly arched; pods sessile, reflexed, half-ovoid, 2.5–3 cm. long, densely soft-pubescent.

Dry hillsides and mesas, Upper Sonoran Zone; Upper Salinas Valley, Monterey County, to San Luis Obispo County, California. Type locality: originally collected by Douglas, presumably on his trip from Monterey to Santa Barbara. April–June.

54. *Astragalus pomonensis* M. E. Jones. Pomona Rattle-weed. Fig. 2828.

Astragalus pomonensis M. E. Jones, Contr. West. Bot. No. 10: 59. 1902.

Phaca pomonensis Rydb. N. Amer. Fl. 24: 346. 1929.

Stems several from the perennial root, decumbent, 6–10 dm. long, the whole plant very sparsely pubescent. Stipules distinct; leaves 15–20 cm. long; leaflets 25–37, oblong-elliptic, 15–25 mm. long; racemes 5–8 cm. long, on stout peduncles; calyx-tube 4 mm. long, pubescent with blackish hairs; corolla cream-colored, 10–12 mm. long; pods much inflated, 3–5 mm. long, oblique, ending in a short deltoid apex; seeds 2 mm. long, light brown.

Dry plains and hills, Upper and Lower Sonoran Zones; interior valleys of southern California. Type locality: Fallbrook, San Diego County, California. March–June.

55. *Astragalus Menziesii* A. Gray. Menzies' Rattle-weed. Fig. 2829.

Phaca densifolia Smith in Rees, Cycl. 27: No. 9. 1814. Not *A. densifolius* Lam.

Phaca Nuttallii Torr. & Gray, Fl. N. Amer. 1: 343. 1838. Not *A. Nuttallii* DC. 1825.

Astragalus Menziesii A. Gray, Proc. Amer. Acad. 6: 217. 1864.

Astragalus vestitus var. *Menziesii* M. E. Jones, Rev. N. Amer. Astrag. 110. 1923.

Stems several from a perennial base, decumbent or ascending, leafy. Stipules connate, often 1 cm. long; leaflets 13–19 pairs, 6–20 mm. long, elliptic, cuneate at base, usually retuse at apex, more or less cinereous-pubescent; peduncles about 1 dm. long; flowers reflexed; calyx-tube 4 mm. long, sparsely pubescent, the teeth subulate, barely 2 mm. long; corolla greenish cream-colored, 10–12 mm. long; pod papery, much inflated, 3–5 cm. long, 2–3 cm. thick and wide, obliquely ovoid; seeds 4 mm. long.

Coastal species ranging from Monterey to southern California. Type locality: Monterey, California. April–Sept.

Astragalus Menziesii subsp. *virgatus* (A. Gray) Abrams. (*A. Crotalariae* var. *virgatus* A. Gray, Bot. Calif. 1: 149. 1876; *A. franciscanus* Sheldon, Minn. Bot. Studies 1: 135. 1894.) Stems sparsely villous; leaflets green, sparingly villous on the veins beneath and sometimes on the margin; pods glabrous or sparsely strigose. Hillsides and bluffs, mainly Transition Zone; Mendocino County to San Mateo County, California.

56. *Astragalus miguelensis* Greene. San Miguel Locoweed. Fig. 2830.

Astragalus miguelensis Greene, Pittonia 1: 33. 1887.

Phaca miguelensis Rydb. N. Amer. Fl. 24: 348. 1929.

Astragalus vestitus var. *miguelensis* Jepson, Fl. Calif. 2: 352. 1936.

Perennial, branched from the base, the branches 15–30 cm. long, the whole plant hoary with a densely matted short woolly pubescence. Leaves 4–8 cm. long; leaflets 19–23, approximate, round-oval to broadly elliptic, 6–12 mm. long, peduncles scarcely equaling the leaves; racemes rather densely flowered, about 3 cm. long in flower; calyx narrowly campanulate, about 6 mm. long, the teeth subulate-lanceolate, about equaling the tube; corolla ochroleucous, 12 mm. long, nearly straight; pods 25–30 mm. long, about 15 mm. wide, and as thick, rounded at base, abruptly short-pointed at apex, woolly-pubescent.

Channel Islands, southern California. Type locality: San Miguel Island. May–Sept.

57. *Astragalus microcystis* A. Gray. Small-pod Locoweed. Fig. 2831.

Astragalus microcystis A. Gray, Proc. Amer. Acad. 6: 220. 1864.

Tragacantha microcystis Kuntze, Rev. Gen. Pl. 964. 1891.

Perennial with a woody caespitose caudex, the stems diffusely branched, decumbent or procumbent, 2–3 dm. long, strigose. Leaves 3–6 cm. long; leaflets 9–13, oblong or lanceolate-elliptic,

6–12 mm. long, appressed-pubescent below, sparsely so or glabrous above; raceme exceeding the leaves, loosely flowered; calyx-tube 1.5 mm. long, white-strigose often with a few intermingling black hairs; lobes subulate, 1 mm. long; corolla rose-colored or white, 5 mm. long, the standard purple-veined; pod round-obovoid, 8–10 mm. long, 5–6 mm. wide, sessile, usually pubescent with spreading white hairs.

Alpine ridges, Boreal Zones; British Columbia south to the Olympic Mountains and east through Washington to Montana. Type locality: Fort Colville, Washington. July–Sept.

58. *Astragalus diurnus* S. Wats. John Day Rattle-weed. Fig. 2832.

Astragalus diurnus S. Wats. Proc. Amer. Acad. 21: 450. 1886.

Astragalus Craigii M. E. Jones, Contr. West. Bot. No. 1: 42. 1900.

Phaca diurna Rydb. N. Amer. Fl. 24: 353. 1929.

Perennial from slender underground rootstock, much branched and tufted, 3–4 dm. high. Leaves 4–5 cm. long; leaflets 9–11, 2–8 mm. long, ovate-obovate, obtuse or retuse, glabrous above, strigose beneath; peduncles shorter than the leaves, slender, few-flowered; calyx-tube turbinate-campanulate, 2 mm. long, the teeth triangular-subulate, nearly equaling the tube; corolla white, tinged with purple at apex, 7–8 mm. long, arched; pod obliquely oblong-ovoid, about 15–18 mm. long and 1 cm. wide, the ventral suture slightly convex at apex and base, and concave in the middle, truncate at base, much flattened at tip and acute, strigose, becoming nearly glabrous in age, stiff-papery.

Dry hillsides, Upper Sonoran Zone; John Day Valley, eastern Oregon. Type locality: Dayville, John Day River, Oregon. May.

Astragalus Gilmanii Tidestrom, Proc. Biol. Soc. Wash. 50: 20. 1937. (*A. triflorus* var. *morans* Crum ex Jepson, Fl. Calif. 2: 354. 1936.) Cespitose perennial, the stems 10–20 cm. long, strigose. Leaves 4–5 cm. long; leaflets 9–13, oblong to obovate-oblong, 5–10 mm. long, cinereous-strigose; racemes shorter than the leaves; calyx 4 mm. long, hirsutulose with white hairs; corolla 7–8 mm. long, dark purple becoming white below; pod sessile, 1-celled, inflated, ovoid, abruptly acute, 2 cm. long, strigose. A little known species apparently restricted to the Panamint Mountains, Mojave Desert, California. Type locality: Death Valley Canyon. It also has been collected at head of Hanaupah and Wild Rose Canyons.

59. *Astragalus Geyeri* A. Gray. Geyer's Rattle-weed. Fig. 2833.

Phaca annua Geyer ex Hook. Lond. Journ. Bot. 6: 213. 1847. Not. *A. annuus* DC. 1802.

Astragalus Geyeri A. Gray, Proc. Amer. Acad. 6: 214. 1864.

Annual, usually much branched, 5–15 cm. high, herbage appressed-pubescent, canescent when young, becoming greener with age. Leaves 3–6 cm. long; leaflets usually rather distinct, 11–19, linear-oblong, 10–15 mm. long, becoming glabrate above; peduncles slender, 10–25 mm. long, 2–5-flowered; calyx-tube campanulate, 1–2 mm. long, the teeth subulate, equaling the tube; corolla whitish, 6 mm. long, the banner strongly arched; pod ovoid, acute, 15–18 mm. long, 8–10 mm. wide, sparsely strigose.

Sandy plains and hillsides, Upper Sonoran Zone; Great Basin region, eastern Oregon, and California east of the Sierra Nevada to Wyoming. Type locality: "drift-sand plains of the Upper Platte." May–Aug.

60. *Astragalus chuckwǎllae* Abrams. Chuckwalla Rattle-weed. Fig. 2834.

Annual, the stems erect, branching from the base and above, 1–3 dm. high, strigose. Leaves 5–8 cm. long; leaflets 9–13, oblong or oblong-elliptic, 8–15 mm. long, glabrous or nearly so above, sparsely strigose below; stipules lanceolate, 3 mm. long, black-hairy; peduncles 5–6 cm. long, usually 5–6-flowered; calyx black-hairy, the teeth subulate, 2 mm. long; corolla 5–6 mm. long, purplish; pod sessile, membranaceous, strigose, 18–20 mm. long, 10–12 mm. wide and thick, rather abruptly short-pointed.

Sandy washes, Lower Sonoran Zone; vicinity of Corn Springs, Chuckwalla Mountains, Colorado Desert, southern California. March–May.

Annua, erecta, ramosa, 1–3 dm. alta, strigosa; folia 5–8 cm. longa; foliola 9–13, oblonga vel oblongo-elliptica, 8–15 mm. longa; pedunculi 5–6 cm. longi, floribus 5–6; calyx nigra, hirsuta; corolla 5–6 mm. longa, purpurea; legumen sessile, 18–20 mm. longum, 10–12 mm. crassum, abrupte apiculatum, membranaceum, strigosum.

Type collected in sandy wash, vicinity of Corn Springs, Chuckwalla Mountains, Colorado Desert, California, P. A. Munz & D. Keck 4779 (no. 155382 Dudley Herbarium).

61. *Astragalus aridus* A. Gray. Annual Desert Rattle-weed. Fig. 2835.

Astragalus aridus A. Gray, Proc. Amer. Acad. 6: 223. 1864.

Tragacantha arida Kuntze, Rev. Gen. Pl. 943. 1891.

Astragalus albatu Sheldon, Minn. Bot. Studies 1: 128. 1894.

Annual, profusely branching from the base, 15–30 cm. high, whole plant densely silvery with appressed pubescence. Leaves 4–7 cm. long; leaflets 7–15, elliptic to obovate, 6–10 mm. long; peduncles slender, shorter than the leaves; racemes loosely few-flowered; calyx-tube 4 mm. long, the teeth lanceolate-subulate, longer than the tube; corolla cream-yellow or tipped with purple, 6–7 mm. long; pods sessile, erect, 10–12 mm. long, 5–6 mm. wide, narrowly ovoid, somewhat incurved, acute.

Sandy desert plains and hillsides; Colorado Desert, southern California, to northern Lower California. Type locality: Colorado Desert, California. March–May.

62. *Astragalus Harwoodii* (Munz & McBurney) Abrams. Harwood's Rattle-weed. Fig. 2836.

Astragalus insularis var. *Harwoodii* Munz & McBurney, Bull. S. Calif. Acad. 31: 66. 1932.

Annual, strigose-canescens throughout, the stems diffusely branching from the base, 1–3 dm.

high. Leaves 4–6 cm. long; leaflets 15–21, linear-oblong, 9–14 mm. long; peduncles shorter or about equaling the leaves; racemes lax, few-flowered; calyx white-strigose, the teeth lanceolate-subulate, 2 mm. long; corolla purple, 5–6 mm. long; pod sessile, obliquely ovoid, abruptly narrowed at the apex to a conical beak, 15–20 mm. long, 10 mm. wide, purple-tinged, strigose.

Sandy washes and flats, Lower Sonoran Zone; Colorado Desert, southern California. Type locality: Blythe Junction, Riverside County, California. Feb.–April.

63. *Astragalus sabulònum* A. Gray. Sand Rattle-weed. Fig. 2837.

Astragalus sabulònum A. Gray, Proc. Amer. Acad. 13: 368. 1878.

Astragalus virgineus Sheldon ex Coville, Contr. U.S. Nat. Herb. 4: 88. 1893.

Phaca sabulònum Rydb. Bull. Torrey Club 40: 47. 1913.

Phaca arenicola Rydb. N. Amer. Fl. 24: 356. 1929.

Annual or short-lived perennial, densely white-silky, branches several from the crown of a slender taproot, decumbent at base or ascending, 1–3 dm. long. Leaflets 9–13, oblong to obovate, 5–12 mm. long, 3–5 mm. wide; peduncles 2–5 cm. long; racemes 2–3 cm. long, few-flowered; calyx white-silky, the tube 2–2.5 mm. long, the teeth lanceolate-subulate, slightly exceeding the tube; corolla 6 mm. long, creamy white, often tinged or veined with purple, the keel strongly arcuate, obtuse; pod sessile, spreading or deflexed, white-villous, lanceolate in outline, 10–12 mm. long, 4–5 mm. wide and about as thick, lower suture strongly curved, the upper straight or nearly so and acute.

Light soils, Lower Sonora Zone; southern Nevada to the Colorado Desert, southern California, Lower California and Sonora. Type locality: southeastern Nevada, "near the confluence of Muddy River with Rio Virgen." Jan.–June.

64. *Astragalus Vaseyi* S. Wats. Vasey's Locoweed. Fig. 2838.

Astragalus Vaseyi S. Wats. Proc. Amer. Acad. 17: 370. 1882.

Phaca Vaseyi Rydb. N. Amer. Fl. 24: 354. 1929.

Perennial with a slightly woody base, the branches rather slender, erect or ascending, 2–8 dm. high, herbage silvery-canescens throughout with a closely appressed strigose pubescence. Leaves 5–10 cm. long; leaflets 13–17, elliptic, apiculate, rarely over 10 mm. long; fruiting peduncles 10–15 cm. long; flowers subsessile, spicate, calyx campanulate, the tube 3 mm. long, the teeth subulate, half the length of the tube; corolla white or yellowish, 7–8 mm. long, strongly arched shortly beyond the calyx; pods spreading, about 10–12 mm. long and 5 mm. wide, acute, firm, strigose, usually recurved.

Desert slopes, Lower Sonoran Zone; San Jacinto Mountains, southern California, to northern Lower California. Type locality: Mountain Springs, San Diego County, California. March–May.

Astragalus Vaseyi var. *metànus* (M. E. Jones) Munz & McBurney, Bull. S. Calif. Acad. 31: 66. 1932. Calyx black-hairy, flowers purple; pod strongly flattened at the tip. San Diego County, California, to northern Lower California.

Astragalus Vaseyi var. *Johnstòni* Munz & McBurney, Bull. S. Calif. Acad. 31: 66. 1932. (*Phaca Deanei* Rydb. N. Amer. Fl. 24: 355. 1929; *Astragalus Vaseyi* var. *Deanei* Jepson, Fl. Calif. 2: 350. 1936.) More glabrous than the species; calyx-teeth 1–2 mm. long, pod scarcely flattened at the tip. Little San Bernardino Mountains to central San Diego County, California.

65. *Astragalus Pulsiferae* A. Gray. Pulsifer's Locoweed. Fig. 2839.

Astragalus Pulsiferae A. Gray, Proc. Amer. Acad. 10: 69. 1874.

Astragalus Suksdorfii Howell, Erythea 1: 111. 1893.

Phaca Suksdorfii Piper, Contr. U.S. Nat. Herb. 11: 369. 1906.

Perennial from a woody root, branches several to many from the crown, slender, prostrate, more or less hoary with a soft spreading villous pubescence. Leaves 2–3.5 cm. long; leaflets mostly 7–9, obovate to broadly oblanceolate, 5–10 mm. long; peduncles slender, 2–3 cm. long, mostly few-flowered; calyx-tube 1 mm. long, exceeded by the lax subulate teeth; corolla white in the banner tinged with purple, 6–7 mm. long, the banner strongly arched; pod 10–12 mm. long, obliquely ovoid, papery and villous, the ventral suture arched at both ends, tipped by a flat up-curved beak.

Gravelly soils, Transition and Canadian Zones; Cascade Mountains and Sierra Nevada from Falcon Valley, Washington, to Placer County, California. Type locality: Sierra and Plumas Counties, California. Named in honor of the discoverer, Mrs. Pulsifer Ames. May–July.

66. *Astragalus pycnostáchyus* A. Gray. Marsh Locoweed. Fig. 2840.

Astragalus pycnostachyus A. Gray, Proc. Amer. Acad. 6: 527. 1864.

Phaca pycnostachyus Rydb. N. Amer. Fl. 24: 357. 1929.

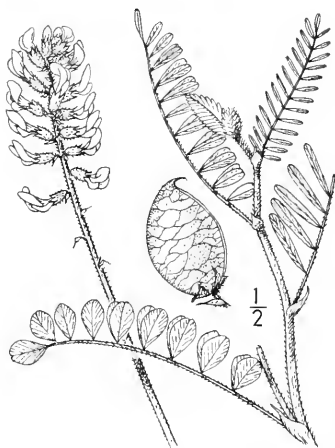
Perennial, the stems stout, erect, 6–10 dm. high, canescent throughout, with a soft lanate pubescence. Leaves 5–8 cm. long; leaflets crowded, 23–35, narrowly oblong-elliptic, 7–15 mm. long; peduncles about equaling the leaves; flowers numerous in dense spikes; calyx campanulate, about 6 mm. long, the teeth subulate, scarcely half the length of the tube; corolla sordid white or the wings yellowish, 10–12 mm. long; pod ovoid, 7–9 mm. long, 4 mm. wide, beaked by the persistent style, nearly glabrous to more or less canescent.

Coastal marshes, Transition and Upper Sonoran Zones; Humboldt County to San Mateo County, California. Type locality: Bolinas Bay. April–Oct.

Astragalus pycnostachyus var. *lanosissimus* (Rydb.) Munz & McBurney, Bull. S. Calif. Acad. 31: 66. 1932. (*Phaca lanosissima* Rydb. N. Amer. Fl. 24: 357. 1929.) Plant hoary with a dense lanate pubescence. Marshes near the coast, Los Angeles County, California.



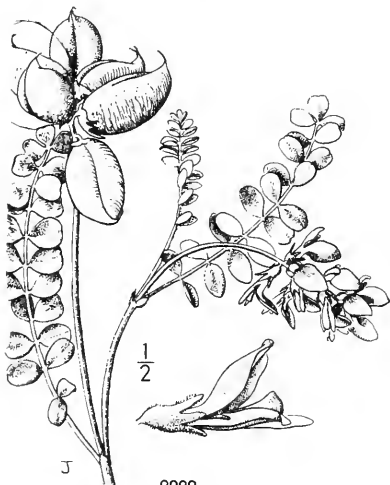
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2828. *Astragalus pomonensis*
 2829. *Astragalus Menziesii*
 2830. *Astragalus miguelensis*

2831. *Astragalus microcystis*
 2832. *Astragalus diurnus*
 2833. *Astragalus Geyeri*

2834. *Astragalus chuckwallae*
 2835. *Astragalus aridus*
 2836. *Astragalus Harwoodii*

67. *Astragalus Hörnii* A. Gray. Sheep Locoweed. Fig. 2841.*Astragalus Hörnii* A. Gray, Proc. Amer. Acad. 7: 398. 1868.*Phaca Hörnii* Rydb. N. Amer. Fl. 24: 358. 1929.*Phaca tularensis* Rydb. N. Amer. Fl. 24: 358. 1929.*Astragalus Hörnii* var. *tularensis* Jepson, Fl. Calif. 2: 354. 1936.

Annual, the stems slender, widely spreading, 6–12 dm. long, herbage green, sparsely appressed-pubescent. Stipules herbaceous, reflexed; leaves 8–10 cm. long; leaflets not crowded, 19–29, narrowly oblong, 1–2 cm. long, obtuse; peduncles 10–20 cm. long; spikes densely-flowered, 4–5 cm. long in fruit; calyx-tube campanulate, 3–4 mm. long, the teeth subulate, about 1.5 mm. long; corolla yellowish, about 8 mm. long; pods erect, crowded, broadly ovoid, acuminate, 10–12 mm. long, pilose, 1-celled.

Low alkaline places, Sonoran Zones; Inyo and Tulare Counties, California, to northern Lower California and southern Utah. Type locality: "Fort Tejon or in Owens Valley," California. Said to be poisonous to sheep. May–Sept.

68. *Astragalus Preussii* A. Gray. Preuss' Locoweed. Fig. 2842.*Astragalus Preussii* A. Gray, Proc. Amer. Acad. 6: 222. 1864.*Tragacantha Preussii* Kuntze, Rev. Gen. Pl. 947. 1891.*Phaca Preussii* Rydb. Bull. Torrey Club 40: 47. 1913.

Perennial, with a stout woody root, and a short caespitose caudex, glabrous throughout; stems several, 2–5 dm. high, stout, glabrous. Leaves 7–11 cm. long; stipules large, broadly deltoid, 4–7 mm. long; leaflets 11–15, broadly obovate to oblong, 8–15 mm. long, obtuse to retuse at apex, glabrous and somewhat fleshy; peduncles 5–10 cm. long; racemes 4–6 cm. long; calyx cylindric, the tube 7–8 mm. long, the teeth subulate, 2–2.5 mm. long; corolla purple, 18–22 mm. long; banner slightly arched; pod glabrous, oblong, slightly curved especially at base, 20–25 mm. long, 6–8 mm. wide and thick; stipe stout, 5–6 mm. long.

Desert plains and hillsides, Lower Sonoran Zone; Mojave Desert along the eastern borders of California to Nevada, southern Utah, and northern Arizona. Type locality: "Banks of the Rio Virgen [Nevada]." March–May.

69. *Astragalus Crotalariae* (Benth.) A. Gray. Salton Locoweed. Fig. 2843.*Phaca Crotalariae* Benth. Pl. Hartw. 307. 1848.*Astragalus Crotalariae* A. Gray, Proc. Amer. Acad. 6: 216. 1864.*Astragalus limatus* Sheldon, Minn. Bot. Studies 1: 126. 1894.*Astragalus Preussii* var. *limatus* Jepson, Man. Fl. Pl. Calif. 566. 1925.

Perennial, with a stout taproot, often flowering as a winter annual, the stems solitary or few, stout, often fistulose, 3–6 dm. high, strigose-pubescent. Leaves ascending with a stout rachis, 7–12 cm. long; leaflets 11–17, oblong-obovate to broadly obovate, rounded or retuse at the apex, 10–20 mm. long, sparsely strigose beneath, glabrous above; stipules ovate-deltoid, free, 5–6 mm. long; peduncles 7–10 cm. long; racemes 4–8 cm. long; calyx strigose with mostly black hairs, the tube 8 mm. long, broadly cylindric, the teeth subulate, 2 mm. long; corolla dark purple, about 2 cm. long; pod obliquely ovoid-ellipsoid, 20–25 mm. long, 10–12 mm. wide, abruptly narrowed at base to a very short stipe and at apex to a 3–4 mm. long mucronation, rather thinly strigose.

Dry plains and washes, Lower Sonoran Zone; Colorado Desert, southern California, southward to adjacent Lower California. Type locality: erroneously given as Monterey, California. Collected by Coulter on his trip from Monterey to Yuma. Feb.–March.

Astragalus Crotalariae var. *Davidsonii* (Rydb.) Munz & McBurney, Bull. S. Calif. Acad. 31: 66. 1932. (*Phaca Davidsonii* Rydb. N. Amer. Fl. 24: 362. 1929.) Leaflets glabrous; pods 5–8 mm. wide, glabrous. Antelope Valley and western edge of the Mojave Desert, California.

70. *Astragalus Cottönii* M. E. Jones. Olympic or Cotton's Rattle-weed. Fig. 2844.*Astragalus olympicus* Cotton, Bull. Torrey Club 29: 573. 1902. Not Pall. 1800.*Astragalus Cottonii* M. E. Jones, Rev. N. Amer. Astrag. 135. 1923.*Atelophragma Cottonii* Rydb. Bull. Torrey Club 55: 121. 1928.

Cespitose perennial, with a deep taproot, the stems several, prostrate, 1–2 dm. long, villous. Leaves 2–3 cm. long, spreading; leaflets 11–17, oblong, 5–12 mm. long, 2–3 mm. wide, acutish, villous-canescens on both sides; peduncles 3–5 cm. long; racemes 2–3 cm. long, 8–15-flowered; calyx-tube 4–5 mm. long, pubescent with mixed black and white hairs, the teeth subulate, 2–3 mm. long; corolla greenish white, the keel purple-tipped, 8–10 mm. long; pods glabrous, ellipsoid, 20–25 mm. long, 8–12 mm. wide, the stipe 5 mm. long.

Talus slopes, Boreal Zones; Olympic Mountains, Washington. Type locality: Olympic Mountains, Washington. June–Aug.

71. *Astragalus Forwoodii* var. *wallowensis* (Rydb.) M. E. Peck. Wallowa Rattle-weed. Fig. 2845.*Atelophragma wallowense* Rydb. Bull. Torrey Club 55: 122. 1928.*Astragalus Forwoodii* var. *wallowensis* M. E. Peck, Man. Pl. Oregon 447. 1941.

Perennial with a woody root and caespitose caudex, the stems decumbent, 1–2 dm. long, strigose. Leaves 2–4 cm. long; leaflets 9–13, oblong-lanceolate, acute at each end, 8–15 mm. long, short villous-canescens below, becoming glabrous or nearly so above; peduncles 3–7 cm. long; racemes becoming elongate and lax in age; calyx black-hairy, the tube 3 mm. long, the teeth subulate, 2 mm. long; corolla about 1 cm. long, purplish, the keel with dark purple tip; pod

oblanceolate in outline, 15 mm. long, 4–5 mm. wide, arched on the upper suture, nearly straight on the lower, glabrous; stipe 5 mm. long.

Rocky slopes and ridges, Boreal Zones; Wallowa Mountains, Oregon. Type locality: Wallowa Mountains, Oregon. June–Aug.

72. *Astragalus alpinus* L. Alpine Rattle-weed or Milk Vetch. Fig. 2846.

Astragalus alpinus L. Sp. Pl. 760. 1753.

Phaca astragalina DC. Astrag. 52. 1802.

Astragalus andinus M. E. Jones, Rev. N. Amer. Astrag. 137. 1923.

Atelophragma alpinum Rydb. Bull. Torrey Club 55: 130. 1928.

Rootstock caespitose, creeping; stems slender, decumbent, 15–25 cm. high, densely or sparsely strigose. Leaves 8–10 cm. long; leaflets 17–19, oval to elliptic; peduncles 7–14 cm. long, racemes short and dense, 8–12-flowered; calyx 4–5 mm. long, black-hairy; corolla purplish with purple-tipped keel, 10–11 mm. long; pods black-hairy, turgid, stipe 1–2 mm. long, body of pod 9–12 mm. long, lower suture sulcate.

Boreal Zones; Alaska and British Columbia south to Okanogan County, Washington, and east to New England. Also Europe and Asia. Type locality: Lapland. June–July.

Atelophragma alpiniforme Rydb. Bull. Torrey Club 55: 129. 1928. Closely related to *Astragalus alpinus* L. and probably only a form with glabrous leaves and smaller flowers. Known only from the type locality, Wallowa Mountains, Oregon.

73. *Astragalus Macounii* Rydb. Macoun's Rattle-weed. Fig. 2847.

Astragalus Macounii Rydb. Mem. N.Y. Bot. Gard. 1: 243. 1900.

Atelophragma Macounii Rydb. Bull. Torrey Club 32: 660. 1906.

Perennial with a caespitose rootstock, the stems 3–6 dm. high, erect, strigose. Leaflets 9–17, oblong to oval or elliptic, 15–25 mm. long, glabrous above, strigose beneath, thin; peduncles 7–15 cm. long; racemes 2–5 cm. long, more elongated in age; calyx black-hairy, 5 mm. long including the short teeth; corolla blue-purple, about 10 mm. long; pod black-hairy, the body 16–18 mm. long, 5 mm. wide and 3 mm. thick, acute at each end, neither suture sulcate.

Edges of bogs or moist copses, Boreal Zones; British Columbia and Alberta to Okanogan County, Washington, Wallowa Mountains, Oregon, Idaho, East Humboldt Mountains, Nevada, and Colorado. Type locality: Deer Park, Lower Arrow Lake, British Columbia. June–Aug.

74. *Astragalus weiserensis* (M. E. Jones) Abrams. Weiser Rattle-weed.

Fig. 2848.

Astragalus Beckwithii var. *weiserensis* M. E. Jones, Zoe 5: 47. 1900.

Phacome weiserensis Rydb. N. Amer. Fl. 29: 383. 1929.

Perennial with a woody root and caespitose caudex, the stems few, ascending, 2–3 dm. high, glabrous. Leaves ascending, 10–15 cm. long; leaflets 7–17, rather distant, glabrous, oval to broadly obovate, obtuse to rounded and retuse at apex, 10–20 mm. long; peduncles 4–7 cm. long; racemes 4–5 cm. long; calyx glabrous or with scattering black hairs on the throat and base of the teeth, the tube 5–7 mm. long, the teeth subulate, equaling the tube; corolla ochroleucous, 18 mm. long; pod leathery, unmottled or faintly so, glabrous, the stipe 5 mm. long, nearly straight, upper suture wing-margined, the lower only slightly sulcate.

Dry flats, Upper Sonoran and Arid Transition Zones; Columbia Basin of eastern Washington, Oregon, and Idaho. Type locality: Weiser, Idaho. April–May.

75. *Astragalus cimae* Jones. Cima Rattle-weed. Fig. 2849.

Astragalus cimae M. E. Jones, Rev. N. Amer. Astrag. 163. 1923.

Astragalus cimensis M. E. Jones, Rev. N. Amer. Astrag. Index. 1923.

Phacome cimae Rydb. N. Amer. Fl. 24: 384. 1923.

Perennial, with a woody root and a caespitose caudex, the stems several, ascending, 1–3 dm. high, glabrous. Leaves ascending, 5–12 cm. long, sparingly strigose on the margins of the leaflets, otherwise glabrous; stipules mainly hyaline, deltoid-lanceolate, 6–8 mm. long; leaflets 15–21, ovate to obovate, rounded or retuse at apex; peduncles 3–8 cm. long; racemes 2–8 cm. long, 5–12-flowered; calyx sparingly black-hairy, the tube 4 mm. long, the teeth subulate, 2 mm. long; corolla purple, 10–11 mm. long; pod rather firm and leathery, glabrous, 2–2.5 cm. long, obcompressed, obliquely oblong in outline in a side view, long-ovate seen from above, upper suture acute, the lower sulcate, the partial septum about 1.5 mm. wide.

Desert slopes, Lower Sonoran Zone; Mojave Desert in the vicinity of the New York and Ivanpah Mountains, California. Type locality: near Cima, San Bernardino County, California. April–May.

76. *Astragalus Arthuri* M. E. Jones. Waha Locoweed. Fig. 2850.

Astragalus Arthuri M. E. Jones, Contr. West. Bot. No. 8: 20. 1898.

Tium Arthuri Rydb. N. Amer. Fl. 24: 388. 1929.

Stems several from the woody crown, slender, erect or ascending, 3–4 dm. high, strigose-pubescent. Leaflets 17–23, oblong, 6–12 mm. long, sparsely pubescent below, glabrous or nearly so above; peduncles erect, often 2 dm. long; racemes at length 6–8 cm. long; calyx with black and white hairs intermingled, the tube 6 mm. long, the teeth barely 2 mm. long; corolla white, about 12 mm. long; pods widely spreading or reflexed, narrowly linear, about 5 cm. long, including the stipe, attenuate at each end, the body about 3 mm. wide, pubescent.

Open slopes, Arid Transition Zone; eastern Washington and northern Idaho. Type locality: Lake Waha, Nez Perce County, Idaho. May–July.

77. *Astragalus Howéllii* A. Gray. Howell's Locoweed. Fig. 2851.*Astragalus Howéllii* A. Gray, Proc. Amer. Acad. 15: 46. 1879.*Tium Howéllii* Rydb. N. Amer. Fl. 24: 389. 1929.

Stems several from the woody root, ascending, 2-3 dm. long, strigose-pubescent. Leaflets 17-21, oblong-elliptical, 7-10 mm. long, cinereous with somewhat appressed woolly pubescence; peduncles 10 cm. long; racemes 3-5 cm. long; calyx sparsely pubescent with whitish hairs, the tube 4-5 mm. long, the teeth 3 mm. long; corolla ochroleucous, 10 mm. long; pods including the stipe 25-30 mm. long, abruptly acute at each end, the body 4 mm. wide, strigose, cuneate-obcordate in cross-section.

Dry plains, Upper Sonoran Zone; Wasco County, eastern Oregon. Type locality: Wasco County, Oregon. May-June.

78. *Astragalus miséllus* S. Wats. Watson's Dwarf Locoweed. Fig. 2852.*Astragalus miséllus* S. Wats. Proc. Amer. Acad. 21: 449. 1886.*Astragalus Howéllii* var. *miséllus* M. E. Jones, Rev. N. Amer. Astrag. 262. 1923.*Tium miséllum* Rydb. N. Amer. Fl. 24: 389. 1929.

Stems decumbent or ascending, 1-2 dm. long, slender, cinereous-strigose, the internodes short. Leaflets 17-21, linear to linear-elliptic, 4-10 mm. long, sparsely strigose beneath, glabrate above; peduncles slender, 2.5-5 cm. long; racemes 3-5 cm. long in fruit; calyx-tube 2 mm. long, strigose, the teeth scarcely 1 mm. long; corolla ochroleucous or white, 5-6 mm. long; pod including the stipe 2 cm. long, 3 mm. wide, abruptly short-acuminate at each end, strigose, almost completely 2-celled by the intrusion of the dorsal suture.

Open dry hills, Upper Sonoran Zone; eastern Washington and Oregon from Pasco, Washington, to the John Day Valley, in Wheeler and Grant Counties, Oregon. Type locality: Mitchell, Wheeler County, Oregon. May-July.

79. *Astragalus inyoénsis* Sheldon. Inyo Locoweed. Fig. 2853.*Astragalus inyoensis* Sheldon, Contr. U.S. Nat. Herb. 4: 86. 1893.*Tium inyoense* Rydb. N. Amer. Fl. 24: 389. 1929.

Stems erect or decumbent at base from a woody caespitose caudex, 3-6 dm. high, sparingly strigose. Leaves 17-21, ovate or obovate, rounded or retuse at the apex, 4-6 mm. long, glabrous above, strigose beneath; peduncles 5-10 cm. long; racemes 2-8 cm. long; calyx strigose, the tube 3 mm. long; corolla purple, about 10 mm. long, the keel orange with purple tip; pod strigose, tapering at both ends, only slightly inflated, 12-15 mm. long, 4-5 mm. wide, 6 mm. thick, the lower suture deeply sulcate, cordate in cross-section, the septum narrow.

Dry gravelly deserts, Lower Sonoran Zone; Inyo and White Mountains, Inyo County, California. Type locality: Darwin Mesa, near Mill Creek Divide. May.

80. *Astragalus Nevínii* S. Wats. Nevin's Locoweed. Fig. 2854.*Astragalus Nevínii* S. Wats. Proc. Amer. Acad. 21: 412. 1886.*Tium Nevínii* Rydb. N. Amer. Fl. 24: 390. 1929.

Stems stout, decumbent, 3 dm. long, hoary. Leaflets 11-17, narrowly obovate or oblanceolate, rounded or retuse at apex, 5-10 mm. long, cinereous, with an upwardly appressed pubescence; peduncles 5-6 cm. long; racemes rather lax, 3-5 cm. long; calyx-tube broadly campanulate, 3-4 mm. long, black-hairy, the teeth scarcely over 1 mm. long; corolla about 10 mm. long, ochroleucous; pod including the slender stipe 20-25 mm. long, 3 mm. wide, arcuate, acute at each end, glabrous, cordate in cross-section.

Known only from San Clemente Island, southern California. April-May.

81. *Astragalus Tráskiae* Eastw. Trask's Locoweed. Fig. 2855.*Astragalus Tráskiae* Eastw. Proc. Calif. Acad. II. 3: 102. 1897.*Astragalus Nevínii* var. *Tráskiae* M. E. Jones, Contr. West. Bot. No. 10: 87. 1902.*Tium Tráskiae* Rydb. N. Amer. Fl. 24: 390. 1929.

Perennial, the decumbent stems woody at the base, 2-4 dm. high, densely white-tomentose. Leaves crowded, 5-9 cm. long; leaflets 17-25, elliptic to broadly oval, 5-12 mm. long, densely white-tomentose on both sides; peduncles 5-10 cm. long; racemes 3-7 cm. long; calyx tomentose, the tube 5 mm. long, the teeth 1 mm. long; corolla yellowish, 15 mm. long; pod white-tomentose, the stipe 6-7 mm. long, the body half-ovoid in outline, 15 mm. long, 4 mm. wide, 6 mm. thick, abruptly acute at each end, lower suture deeply sulcate, the sulcus extending nearly halfway and the septum nearly to the upper suture.

Bluffs and mesas, in heavy soil, Upper Sonoran Zone; Islands of San Nicolas, Santa Barbara, and Anacapa, southern California. Type locality: San Nicolas Island. April-May.

82. *Astragalus mensàrus* (M. E. Jones) Abrams. Darwin Mesa Locoweed. Fig. 2856.*Astragalus atratus* var. *mensarus* M. E. Jones, Proc. Calif. Acad. II. 5: 665. 1895.*Tium mensarum* Rydb. N. Amer. Fl. 24: 395. 1929.

Cespitose perennial, with a short woody caudex, the stems several, erect or decumbent, slender, 2-3 dm. long, strigose-canescens. Leaflets 11-15, elliptic or oblong, or those of the upper leaves linear, 8-10 mm. long, strigose-canescens on both sides; calyx strigose-canescens, the tube 4 mm. long, teeth 1-1.5 mm. long; corolla 10 mm. long, purple; pod narrowly oblong, 15 mm.



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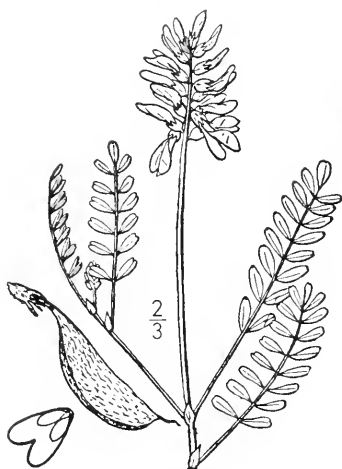


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2837. *Astragalus sabulonum*
 2838. *Astragalus Vaseyi*
 2839. *Astragalus Pulsiferae*

2840. *Astragalus pycnostachyus*
 2841. *Astragalus Hornii*
 2842. *Astragalus Preussii*

2843. *Astragalus Crotalariae*
 2844. *Astragalus Cottonii*
 2845. *Astragalus Forwoodii*



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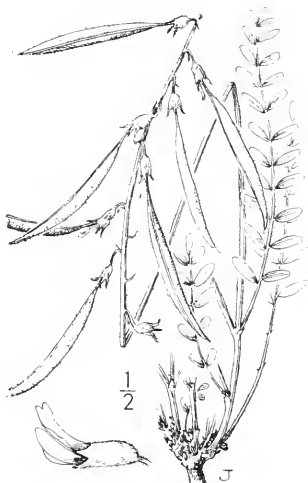
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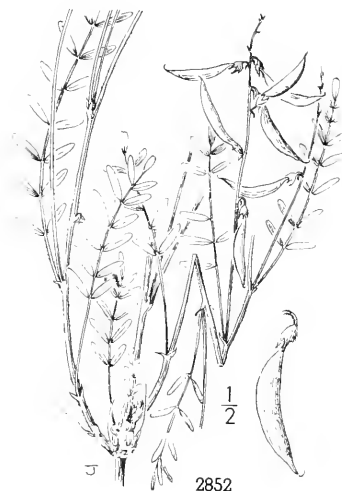
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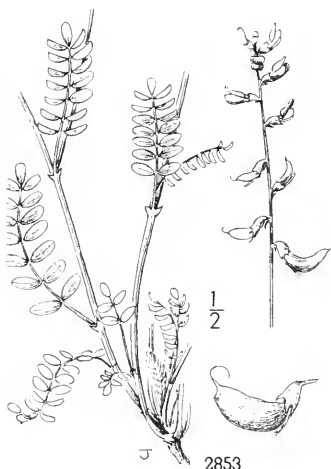
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2846. *Astragalus alpinus*
 2847. *Astragalus Macounii*
 2848. *Astragalus weiserensis*

2849. *Astragalus cimae*
 2850. *Astragalus Arthuri*
 2851. *Astragalus Howellii*

2852. *Astragalus misellus*
 2853. *Astragalus inyoensis*
 2854. *Astragalus Nevinii*

long, 3 mm. wide and scarcely as thick, strigose, acute at apex, attenuate at base; septum broad, extending halfway to the upper suture.

Dry desert slopes, Sonoran Zones; Darwin Mesa, Inyo County, California. Type locality: Mill Creek Divide, Darwin Mesa, California. April-May.

83. *Astragalus owyheënsis* A. Nels. Owyhee Locoweed. Fig. 2857.

Astragalus owyheënsis A. Nels. Bot. Gaz. 55: 375. 1913.

Astragalus atratus var. *owyheënsis* M. E. Jones, Rev. N. Amer. Astrag. 182. 1923.

Perennial, the stems several from a woody crown, prostrate, 2-5 dm. long, whole plant sparsely strigose. Leaflets 5-13, remote, linear, about 1 cm. long; racemes loosely flowered, exceeding the leaves; calyx strigose and black-hairy, the tube 3 mm. long, the teeth subulate, 1 mm. long; corolla white, 8-10 mm. long; pod oblong-linear, 8-10 mm. long, 3 mm. wide, 4 mm. thick, strigose, mottled with purple, the lower suture sulcate.

Sagebrush plains, Upper Sonoran Zone; eastern Oregon and adjacent Idaho in the Owyhee River region. Type locality: above the "Hot Hole" of the East Bruneau, Owyhee County, Idaho. June-July.

84. *Astragalus salmònis* M. E. Jones. Trout Creek Locoweed. Fig. 2858.

Astragalus salmonis M. E. Jones, Contr. West. Bot. No. 8: 9. 1898.

Tium salmonis Rydb. N. Amer. Fl. 24: 396. 1929.

Cespitose, the stems tufted from a woody crown, rarely 2-5 cm. long. Leaves 4-6 cm. long; leaflets 9-13 or more, linear, 2-8 mm. long, strigose beneath, glabrous above; peduncles scape-like, 5-15 cm. long; racemes short, usually 3-4-flowered; calyx-tube 4 mm. long, strigose, the teeth subulate, 2 mm. long; corolla greenish white tinged with purple, 10-12 mm. long; pods strigose, sessile or subsessile, about 2 cm. long, 5-7 mm. thick and about as wide, reniform in cross-section, shallowly and broadly sulcate on the lower suture, the septum intruding about halfway.

Dry stony ridges, Transition Zone; Blue Mountains, Oregon. Type locality: Trout Creek, Grant County, Oregon. April-May.

85. *Astragalus panaminténsis* Sheldon. Panamint Locoweed. Fig. 2859.

Astragalus panamintensis Sheldon, Contr. U.S. Nat. Herb. 4: 87. 1893.

Astragalus atratus var. *panamintensis* Jepson, Man. Fl. Pl. Calif. 575. 1925.

Tium panamintense Rydb. N. Amer. Fl. 24: 396. 1929.

Cespitose perennial, the stems distinctly woody below forming tufts, the herbaceous branches with very short internodes, silky-strigose. Leaves 5-7 cm. long; leaflets remote, seldom over 9, narrowly linear-lanceolate, acute, 5-8 mm. long, silky; peduncles shorter than the leaves, mostly 2-3-flowered; calyx-tube scarcely 3 mm. long, silky or black-hairy, the teeth subulate, about equaling the tube; corolla white, tipped with purple, 12-15 mm. long; pod 15 mm. long, 3 mm. wide and 2 mm. thick, sessile, rounded at the apex, broadly sulcate on the dorsal suture, silky-strigose.

Rocky cliffs, Upper Sonoran Zone; Panamint Mountains, California. Type locality: Surprise Canyon, altitude 1,300 meters. April-May.

86. *Astragalus eremíticus* Sheldon. Eremitic Locoweed. Fig. 2860.

Astragalus eremiticus Sheldon, Minn. Bot. Studies 1: 161. 1894.

Astragalus boiscanus A. Nels. Bot. Gaz. 53: 223. 1912.

Cespitose perennial, the stems several, 3-5 dm. high, nearly or quite glabrous. Leaves 7-10 cm. long; leaflets 21-35, oblong to oval, 8-18 mm. long, glabrous above, sparingly strigose beneath; peduncles 5-15 cm. long; raceme 5-10 cm. long, lax; calyx sparingly black-hairy, the tube 5 mm. long, the teeth scarcely 2 mm. long; corolla white, yellowish or purple, about 15 mm. long; pod glabrous, oblong, abruptly contracted at each end, 15-20 mm. long, 6 mm. wide and 5 mm. thick, reniform in cross-section, the septum 1 mm. wide.

Dry plains, Arid Transition and Upper Sonoran Zones; eastern Oregon to Idaho and northern Arizona. April-May.

Astragalus malheurénsis Heller, Cat. N. Amer. Pl. ed. 2. 7. 1900. (*A. Cusickii* Rydb. Bull. Torrey Club 26: 541. 1899.) Essentially like *A. eremiticus* Sheldon, and possibly only a form of that species, the chief differences being the linear leaflets which are 20-30 mm. long and 2 mm. wide. Malheur County, Oregon.

87. *Astragalus arréctus* A. Gray. Palouse Locoweed. Fig. 2861.

Astragalus arrectus A. Gray, Proc. Amer. Acad. 8: 289. 1870.

Astragalus palousensis Piper, Bot. Gaz. 22: 489. 1896.

Phaca arrecta Piper, Contr. U.S. Nat. Herh. 11: 371. 1906.

Stems erect from a woody crown, 3-5 dm. high, glabrous or nearly so. Leaflets 15-31, linear or linear-oblong, 1-2 cm. long, sparsely strigose below, glabrate above; peduncles stout, erect, 1-2 dm. long; racemes loosely flowered, 6-8 cm. long; calyx-tube campanulate, about 3 mm. long, sparsely strigose, the teeth triangular-subulate, 1 mm. long; corolla 10 mm. long, ochroleucous; stipe about equaling the calyx-tube; pod strigose, 15-20 mm. long, 3 mm. wide, 5 mm. thick, the lower suture deeply and broadly sulcate, often intruding almost to the upper suture, but without septum.

Hillsides, Upper Sonoran and Arid Transition Zones; eastern Washington and northeastern Oregon to adjacent Idaho. Type locality: Clearwater River, Idaho. May-June.

Astragalus arrectus var. *Leibérgii* M. E. Jones, Contr. West. Bot. No. 10: 68. *pl.* 13. 1902. This variety differs from the typical form of the species in the narrowly linear (1 mm. wide) leaves. Eastern Washington and Idaho. Type locality: Egbert Springs, Douglas County, Washington.

88. *Astragalus conjunctus* S. Wats. Strict Locoweed. Fig. 2862.*Astragalus conjunctus* S. Wats. Proc. Amer. Acad. 17: 371. 1882.*Astragalus arrectus* var. *conjunctus* M. E. Jones, Contr. West. Bot. No. 10: 61. 1902.*Phaca conjuncta* Piper, Contr. U.S. Nat. Herb. 11: 373. 1906.*Tium Sheldonii* Rydb. N. Amer. Fl. 24: 393. 1929.

Stems tufted on a woody crown, erect or ascending, rather slender, about 1 dm. high, glabrous or nearly so. Leaves 15–20 cm. long; leaflets rather remote, 15–23, narrowly linear, 5–15 mm. long, sparsely strigose; peduncles scape-like, 2–3 dm. long; racemes at length 4–15 cm. long; calyx-tube 8 mm. long, sparsely black-hairy, the teeth triangular-subulate, 2–3 mm. long; corolla purple or tinged with purple, 2 cm. long; pods sessile, erect, 20–25 mm. long, 4–5 mm. wide, 5–6 mm. thick, obtuse or rounded at base, abruptly acuminate above into a slender beak, glabrous, chartaceous, the lower suture slightly sulcate.

Dry hillsides, Upper Sonoran Zone; eastern Washington to southeastern Oregon and Idaho. Type locality: John Day Valley, Oregon. May–June.

Astragalus conjunctus var. *oxytropidoides* M. E. Jones, Proc. Calif. Acad. II. 5: 665. 1895. (*Tium oxytropoides* Rydb. N. Amer. Fl. 24: 393. 1929.) Mainly distinguished from typical *A. conjunctus* by the strigose pods. Vicinity of The Dalles, Oregon.

89. *Astragalus miser* Dougl. Douglas' Dwarf Locoweed. Fig. 2863.*Astragalus miser* Dougl. ex Hook. Fl. Bor. Amer. 1: 153. 1838.*Astragalus obscurus* S. Wats. Bot. King Expl. 69. 1871.*Tium miserum* Rydb. N. Amer. Fl. 24: 394. 1929.

Stems several arising from a caespitose caudex, slender, 5–15 cm. high, ascending. Leaflets 9–15, linear or oblong, 3–10 mm. long, 1–2 mm. wide, strigose on both sides; peduncles 6–10 cm. long; racemes 2–5 cm. long; calyx strigose, with intermingling white and black hairs, the tube 3 mm. long; corolla 8–10 mm. long, yellowish, the keel tipped with purple; pod sessile, linear, 15–20 mm. long, acute at both ends, strigose, the lower suture sulcate, the septum about 1 mm. wide.

Dry hillsides, Arid Transition Zone; eastern Washington to Idaho and Nevada, and northeastern California to Lake Tahoe. Type locality: Spokane River, Washington. April–May.

90. *Astragalus Brauntönii* Parish. Braunton's Rattle-weed. Fig. 2864.*Astragalus Brauntönii* Parish, Bull. S. Calif. Acad. 2: 26. 1903.*Brachyphragma Brauntönii* Rydb. N. Amer. Fl. 24: 399. 1929.

Perennial, the whole plant densely canescent-tomentose, woody below; stems of the season stout, erect or reclinate, 1–1.5 m. high. Leaflets 25–41, oblong to oblong-elliptic, 6–20 mm. long; peduncles 3–5 cm. long; racemes dense, 4–9 cm. long; flowers reflexed; calyx-tube 3 mm. long, the teeth subulate, 2.5–3 mm. long; corolla rose-purple, 10 mm. long; pod sessile, coriaceous, obliquely oblong-ovoid, 8–10 mm. long, densely tomentose, rounded at base, acute at apex, upper suture ribbed, the lower sulcate.

Dry clay soils, Upper Sonoran Zone; coastal southern California. Type locality: near Santa Monica, California. April–June.

91. *Astragalus Serènoi* (Kuntze) Sheldon. Humboldt Rattle-weed. Fig. 2865.*Astragalus nudus* S. Wats. Bot. King Expl. 74. 1871. Not Clos. 1846.*Tragacantha Serènoi* Kuntze, Rev. Gen. Pl. 941. 1891.*Astragalus Serènoi* Sheldon, Minn. Bot. Studies 1: 130. 1894.*Astragalus Shockleyi* M. E. Jones, Proc. Calif. Acad. II. 5: 659. 1895.*Brachyphragma Serènoi* Rydb. Amer. Journ. Bot. 16: 205. 1929.

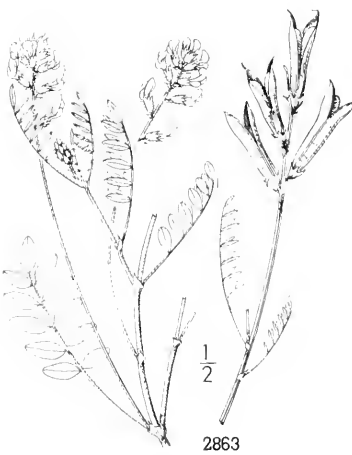
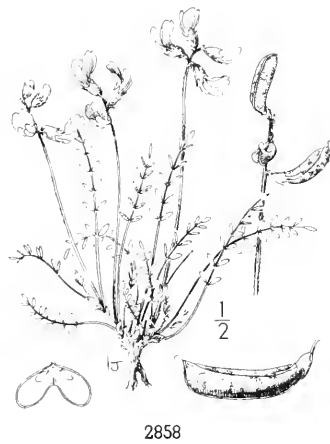
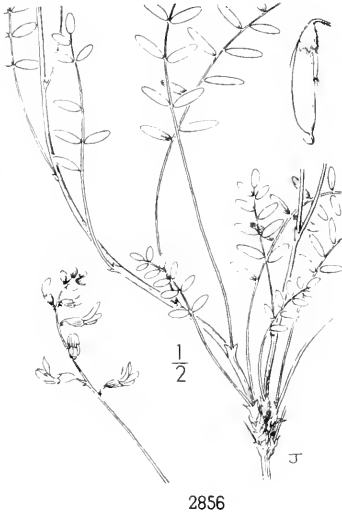
Perennial with a woody base, stems several, decumbent at base, 4–6 dm. high, glabrous, branching. Leaves 10–15 cm. long; leaflets 3–7, very sparsely strigose or glabrate above, densely white-strigose beneath, those of the lower leaves oblanceolate to narrowly oval, those of the upper leaves linear, 2–4 cm. long, 1–4 mm. wide, acute at each end; peduncles 10–20 cm. long; racemes loosely flowered, 2–10 cm. long; calyx-tube 6–7 mm. long, black-hairy, the teeth subulate, 4–5 mm. long; corolla about 2 cm. long, the banner much exceeding the keel, purple and white; pods woody-coriaceous, glabrous and wrinkled, oblong, 15–25 mm. long, 10 mm. wide and about as thick, abruptly narrowed to the slender beak, the septum 2 mm. wide, not extending to the apex.

Canyons of desert ranges, Upper Sonoran Zone; eastern California to central Nevada. Type locality: West Humboldt Mountains, Nevada. April–June.

92. *Astragalus mohavénsis* S. Wats. Mojave Rattle-weed. Fig. 2866.*Astragalus mohavensis* S. Wats. Proc. Amer. Acad. 20: 361. 1885.

Perennial from a taproot, the stems much branched from the base, decumbent, 2–4 dm. long, the whole plant hairy with a short appressed pubescence. Leaflets usually 7–9, obovate-elliptic to lanceolate-elliptic, 5–15 mm. long; peduncles 5–8 cm. long, about equaled by the fruiting racemes; calyx-tube 3 mm. long, the teeth subulate, 2 mm. long; corolla purple, 7 mm. long; pod compressed, oblong, 15–20 mm. long, 6–7 mm. wide, strigose, both sutures prominent.

Dry desert washes, Lower Sonoran Zone; Mojave Desert of southern California to southern Nevada. Type locality: "In a canyon south of Newberry Spring in the Mojave Valley, in large depressed masses." March–May.



2855. *Astragalus Traskiae*
2856. *Astragalus mensarus*
2857. *Astragalus owyheensis*

2858. *Astragalus salmonis*
2859. *Astragalus panamintensis*
2860. *Astragalus eremiticus*

2861. *Astragalus arrectus*
2862. *Astragalus conjunctus*
2863. *Astragalus miser*

93. *Astragalus pachypus* Greene. Thick-podded Rattle-weed. Fig. 2867.*Astragalus pachypus* Greene, Bull. Calif. Acad. 1: 157. 1885.*Brachyphragma pachypus* Rydb. N. Amer. Fl. 24: 401. 1929.

Perennial, distinctly woody below, the branches of the season several, densely strigose, ascending. Leaves 10–15 cm. long; leaflets rather distant, 15–21, narrowly linear, 15–20 mm. long, white-strigose; peduncles stout, 10–20 cm. long; racemes loosely flowered, 5–10 cm. long; calyx-tube 4 mm. long and as broad, sparingly black-hairy, the teeth subulate, 3 mm. long; corolla 16–20 mm. long, white or cream-colored; pods thick-coriaceous, glabrous, wrinkled, 18–25 mm. long, 5 mm. wide, compressed, both sutures prominent.

Gravelly or sandy soils, Upper Sonoran Zone; Inner Coast Ranges, San Benito County, south to the San Jacinto Mountains, southern California. Type locality: Tehachapi Mountains, Kern County, California. March–May.

Astragalus pachypus var. *Jaegeri* Munz & McBurney, Bull. S. Calif. Acad. 31: 67. 1932. Differs from the species in having yellow flowers 12–13 mm. long. Desert slopes, western Riverside County, California.

94. *Astragalus Coulteri* Benth. Coulter's Locoweed. Fig. 2868.*Astragalus Coulteri* Benth. Pl. Hartw. 307. 1848.*Astragalus lentiginosus* var. *Coulteri* M. E. Jones, Contr. West. Bot. No. 8: 4. 1898.*Cystium Coulteri* Rydb. Bull. Torrey Club 40: 50. 1913.

Perennial or biennial from a taproot, often flowering as a winter annual, the stems ascending or decumbent, flexuous, densely silvery-strigose. Leaflets mostly 13–17, oval to obovate, obtuse or retuse, densely silky-strigose, 7–15 mm. long; peduncle stout, 5–8 cm. long; racemes loosely flowered, 5–10 cm. long; calyx-tube cylindrical, 4 mm. long, densely silvery-strigose, the teeth subulate, 2–3 mm. long; corolla purple, 12–14 mm. long; pod much inflated, rather chartaceous, the mottled surface usually obscured by the densely white-strigose pubescence, the body subglobose, 10–12 mm. long, the beak 3–6 mm. long.

Dry desert hillsides and washes in sandy soils, Lower Sonoran Zone; Mojave and Colorado Deserts, southern California to western Arizona and southern Nevada. Type locality: collected by Coulter on his trip from Monterey, California, to Yuma. March–June.

95. *Astragalus agninus* Jepson. Borrego Locoweed. Fig. 2869.*Astragalus lentiginosus* var. *borreganus* M. E. Jones, Rev. N. Amer. Astrag. 126. 1923.*Astragalus agninus* Jepson, Man. Fl. Pl. Calif. 577. 1925.*Cystium agninus* Rydb. N. Amer. Fl. 24: 408. 1929.

Annual or biennial, with several stems arising from a taproot, 3–5 dm. high, branching and somewhat flexuose, densely white-silky. Leaves 5–10 cm. long; leaflets 7–15, oblong to obovate, obtuse to retuse, 6–12 mm. long, densely white-silky on both surfaces; peduncles 3–10 cm. long, usually equalled or exceeded by the rather loosely flowered racemes; calyx-tube 5 mm. long, the teeth triangular-subulate, 1 mm. long; corolla purple, 10–12 mm. long; pods lanceolate, 12–15 mm. long, 4–5 mm. thick, slightly inflated, shallowly sulcate on the upper suture, nearly straight or strongly falcate, densely white-silky.

Desert washes, Lower Sonoran Zone; Colorado Desert, Borrego Valley, California, to Yuma, Arizona. Type locality: Borrego Springs, San Diego County, California. April–May.

96. *Astragalus Arthu-Schottii* A. Gray. Schott's Locoweed. Fig. 2870.*Astragalus Arthu-Schottii* A. Gray, Proc. Amer. Acad. 6: 209. 1864.*Cystium Arthu-Schottii* Rydb. N. Amer. Fl. 24: 409. 1929.

Perennial, the taproot becoming woody with age; stems several, branching from the base, and ascending or decumbent, 10–30 cm. long, white-silky. Leaves 4–10 cm. long; leaflets rather distant, 7–17, elliptic to obovate, rounded or retuse at the apex, 7–15 mm. long, silky-pubescent on both sides; peduncles 4–10 cm. long; racemes about the same length, loosely flowered; calyx appressed-pubescent, the tube 4 mm. long, the teeth 2 mm. long, subulate; corolla purple, 10–12 mm. long; pod broadly ovoid, well inflated, deeply sulcate on the upper suture, papery, 15 mm. long, 10–12 mm. thick, abruptly narrowed to a short upturned apex, sparsely strigose and conspicuously mottled.

Sandy or gravelly soils, Lower Sonoran Zone; Mojave and Colorado Deserts, southern California, to southwestern Nevada, Arizona, Sonora, and Lower California. Type locality: diluvial banks of the Colorado near its mouth. Feb.–May.

97. *Astragalus Fremontii* subsp. *eremicus* (Sheldon) Abrams. Fremont's Locoweed. Fig. 2871.*Astragalus eremicus* Sheldon, Contr. U.S. Nat. Herb. 4: 86. 1893.*Cystium Kennedyi* Rydb. N. Amer. Fl. 24: 407. 1929.*Cystium eremicum* Rydb. N. Amer. Fl. 24: 409. 1929.

Annual or perennial with a stout taproot, the stems branching from the base, decumbent or ascending, 3–6 dm. long, rather sparsely silky-tomentose. Leaves ascending, 8–12 cm. long, leaflets 11–21, oblong-elliptic to narrowly obovate, 1–2 cm. long, rather sparsely short-villous on both surfaces with kinky hairs; peduncles 5–10 cm. long, about equaling the racemes; calyx-tube 5 mm. long, sparsely pubescent with black hairs, the teeth subulate, erect or recurved, 2 mm. long; corolla purple, 7–10 mm. long; pod broadly ovoid, 18–25 mm. long, papery, abruptly narrowed to a straight stout beak, glabrous or sparsely strigose.

Sandy soils, Upper Sonoran Zone; eastern borders of California and western Nevada. Type locality: near Lone Pine, Inyo County, California. May–Oct.

98. *Astragalus nigricálycis* (M. E. Jones) Abrams. Black Locoweed. Fig. 2872.

Astragalus lentiginosus var. *nigricálycis* M. E. Jones, Proc. Calif. Acad. II, 5: 674. 1895.
Cystium nigricályce Rydb. N. Amer. Fl. 24: 408. 1929.

Perennial from a woody root, the stems several from the crown, decumbent, 2-5 dm. long, more or less densely short-tomentose. Leaves ascending or somewhat spreading, 6-8 cm. long; leaflets 15-23, obovate, often rather narrowly so, rounded or obtuse at apex, 6-12 mm. long, mostly glabrous above, loosely pubescent or tomentose beneath; peduncles 4-8 cm. long; racemes 2-5 cm. long, rather densely flowered, the tube cylindric, 4 mm. long, black-hairy, the teeth triangular-subulate, scarcely over 1 mm. in length; corolla 12 mm. long, ochroleucous or tinged with rose-purple; pods broadly ovoid, 15-20 mm. long, 10-12 mm. wide and as thick, mottled and rather densely pubescent with spreading hairs, the beak 3-5 mm. long, somewhat curved upward.

Sandy plains, Lower Sonoran Zone; abundant in the upper San Joaquin Valley, California. Type locality: Bakersfield, Kern County, California. Feb.-April.

99. *Astragalus tehachapiénsis* (Rydb.) Tidestrom. Tehachapi Locoweed.
 Fig. 2873.

Cystium tehachapiense Rydb. N. Amer. Fl. 24: 414. 1929.
Astragalus tehachapiénsis Tidestrom, Proc. Biol. Soc. Wash. 50: 21. 1937.

Perennial from a woody rootstock, the stems 3-4 dm. long, ascending, rather stout and flexuous, glabrous or nearly so, stipules triangular-lanceolate, mainly membranous, about 4 mm. long, spreading or reflexed. Leaves 5-7 cm. long; leaflets 15-19, broadly obovate, retuse, 7-15 mm. long, bright green, glabrous above, very sparsely strigose beneath; peduncles stout, 3-5 cm. long; racemes about 2 cm. long, densely flowered; calyx-tube narrowly campanulate, 4-5 mm. long, sparsely black-hairy, the teeth triangular-subulate, scarcely 1 mm. long; corolla ochroleucous, tipped with purple, 12 mm. long; pod much inflated, obliquely ovoid, about 2.5 cm. long and 1.5 cm. thick, abruptly narrowed to a prominent upcurved beak, papery, mottled, glabrous.

Fields and gentle slopes, Upper Sonoran Zone; Tehachapi Mountains, California. Type locality: fields near Tehachapi, California. April-May.

100. *Astragalus albifolius* (M. E. Jones) Abrams. White-leaved Locoweed.
 Fig. 2874.

Astragalus lentiginosus var. *albifolius* M. E. Jones, Rev. N. Amer. Astrag. 124. 1923.
Cystium albifolium Rydb. N. Amer. Fl. 24: 413. 1929.

Perennial, stems several, widely spreading and prostrate, 3-7 mm. long, slender, strigose. Leaves 4-6 cm. long, divergent or reflexed, sessile or nearly so; leaflets 11-15, oblong to elliptic, 10-15 mm. long, pallid and more or less hoary-strigose; peduncles 1.5-4 cm. long, divergent or ascending; racemes rather densely-flowered, in fruit 2-4 cm. long and the pods crowded; calyx-teeth cylindric, 3 mm. long, silky, the teeth subulate, about 2 mm. long; corolla 8-10 mm. long, ochroleucous or tinged with pink; pods subglobose, papery, about 1 cm. long, the beak 2-3 mm. long or reduced to a mere apiculation.

Alkaline plains, Lower Sonoran Zone; Mojave Desert, southern California. Type locality: Lone Pine, Inyo County, California. May-June.

101. *Astragalus platytropis* A. Gray. Broad-keeled Locoweed. Fig. 2875.

Astragalus platytropis A. Gray, Proc. Amer. Acad. 6: 526. 1865.
Tragacantha platytropis Kuntze, Rev. Gen. Pl. 947. 1891.
Cystium platytrope Rydb. N. Amer. Fl. 24: 406. 1929.

Cespitose perennial from stout horizontal rootstocks, densely silvery-silky throughout, the stems short, seldom over 5-8 cm. long. Leaflets 7-13, obovate to oblong, about 5 mm. long; peduncles 15-25 mm. long; flowers subcapitate; calyx-tube densely silky-pubescent, 3-4 mm. long, equaled or exceeded by the subulate teeth; corolla 6-7 mm. long, scarcely exerted, ochroleucous, except the purple keel; pod ovoid, very short-pointed, 15-20 mm. long, strigose, and usually mottled.

Gravelly alpine slopes, Boreal Zones; Sierra Nevada, California, to the Humboldt and Wasatch Mountains, Nevada. Type locality: mountain near Sonora Pass, California, growing in loose gravel and sand near the summit, altitude 10,000 feet. July-Aug.

102. *Astragalus araneosus* Sheldon. Gilliam Locoweed. Fig. 2876.

Astragalus araneosus Sheldon, Minn. Bot. Studies 1: 170. 1894.
Cystium platyphyllidium Rydb. N. Amer. Fl. 24: 410. 1929.
Astragalus lentiginosus var. *cuspidocarpus* M. E. Jones, Proc. Calif. Acad. II, 5: 673. 1895. Not *A. cuspidocarpus* Sheldon. 1894.
Cystium cornutum Rydb. N. Amer. Fl. 24: 412. 1929.

Perennial with a cespitose caudex, the stems decumbent, 3-4 dm. long, glabrous. Leaves 5-10 cm. long; leaflets 11-15, obovate to oblong-obovate, 1-2 cm. long, 5-12 mm. wide, glabrous, rounded or retuse at apex; peduncles 3-4 cm. long; racemes 1.5-2 cm. long, 5-10-flowered; calyx sparsely black-hairy, the tube 4 mm. long, the teeth subulate, 2 mm. long; corolla about 12-15 mm. long, white tipped with purple; pod ovoid-lanceolate, arcuate, slightly sulcate at least on the upper suture, 20-25 mm. long, 5-7 mm. wide, leathery, glabrous or becoming glabrate and mottled.

Dry hillsides, Arid Transition and Upper Sonoran Zones; eastern Washington to northeastern California, Idaho, and Nevada. Type locality: Pine Creek, Gilliam County, Oregon. April-June.

103. *Astragalus salinus* Howell. Salt Locoweed. Fig. 2877.*Astragalus salinus* Howell, *Erythea* 1: 111. 1893.*Cystium salinum* Rydb. *N. Amer. Fl.* 24: 411. 1929.*Astragalus lentiginosus* var. *chartaceus* M. E. Jones, *Proc. Calif. Acad. II.* 5: 673. 1895.

Perennial, the stems decumbent or ascending, 10–20 cm. long, rather slender, very sparsely strigose. Leaflets 9–17, obovate, obtuse or retuse, 8–12 mm. long; racemes subcapitate; calyx-tube 3 mm. long; teeth about 2 mm. long; corolla ochroleucous, 8–9 mm. long; pod well inflated, broadly ovoid, about 15 mm. long, with a short curved beak, thin-chartaceous and glabrous.

Saline soils, Upper Sonoran Zone; southeastern Oregon and central and southern Idaho. Type locality: Harney County, Oregon. June–Aug.

104. *Astragalus lentiginosus* Dougl. Mottled Rattleweed. Fig. 2878.*Astragalus lentiginosus* Dougl. ex Hook. *Fl. Bor. Amer.* 1: 151. 1834.*Cystium lentiginosum* Rydb. *N. Amer. Fl.* 24: 412. 1929.

Perennial from a deep taproot, the stems branching from the base, decumbent, 1.5–3 dm. long, glabrous or sparsely pubescent with upwardly appressed hairs. Leaflets 11–19, narrowly to broadly obovate, 5–10 mm. long, glabrous or sparsely strigose; flowers in subcapitate racemes; calyx-tube campanulate, 3–4 mm. long, sparsely hairy, the teeth subulate, 2 mm. long; corolla ochroleucous, 8–9 mm. long; pod ovoid, more or less strongly incurved, 15–20 mm. long, abruptly tapering to a stout upcurved beak, usually mottled, rather thinly strigose.

Arid plains, Upper Sonoran and Arid Transition Zones; southeastern Washington to northeastern California and east to Idaho and Utah. Type locality: "Subalpine ranges of the Blue Mountains of North-West America." May–July.

105. *Astragalus ineptus* A. Gray. Sierra Locoweed. Fig. 2879.*Astragalus ineptus* A. Gray, *Proc. Amer. Acad.* 6: 525. 1865.*Cystium ineptum* Rydb. *Bull. Torrey Club* 32: 659. 1905.*Astragalus lentiginosus* var. *ineptus* M. E. Jones, *Rev. N. Amer. Astrag.* 124. 1923.*Astragalus lentiginosus* var. *sierrae* M. E. Jones, loc. cit.*Astragalus kernensis* Jepson, *Man. Fl. Pl. Calif.* 569. 1925.

Cespitose perennial, branched from the woody caudex, the stems decumbent, 1–3 dm. long, sparsely strigose. Leaves 3–6 cm. long; leaflets linear-oblong to narrowly elliptic, 6–10 mm. long, sparsely strigose and somewhat canescent; peduncles slender, shorter than the leaves; racemes short, usually not more than 2 cm. long; calyx-tube cylindric, 4 mm. long, loosely short-pubescent, the teeth subulate, about 2 mm. long; pod ovoid, abruptly short-beaked, the body about 12–16 mm. long, 7–8 mm. wide and thick, papery, strigose and mottled.

Gravelly mountain slopes, Arid Transition Zone; northern Sierra Nevada to the San Bernardino Mountains, California. Type locality: rocky mountain slopes at 9,000 feet altitude near Sonora Pass, California. July–Aug.

106. *Astragalus idriensis* (M. E. Jones) Abrams. Idria Locoweed. Fig. 2880.*Astragalus lentiginosus* var. *idriensis* M. E. Jones, *Contr. West. Bot. No.* 10: 63. 1902.*Cystium idriense* Rydb. *N. Amer. Fl.* 24: 414. 1929.

Perennial, with a cespitose woody caudex, the stems several, decumbent, 2 dm. long, sparsely strigose. Leaves 2–4 cm. long; leaflets 13–19, obovate, 5–8 mm. long, obtuse or rounded at apex, strigose beneath, glabrous above; peduncles 3–5 cm. long; raceme 2 cm. long, densely flowered; calyx sparsely strigose, the tube 4 mm. long, the teeth subulate, 1 mm. long; corolla 10–12 mm. long, purple or the banner with a white spot; pod narrowly ovoid, 15–20 mm. long, 4–5 mm. wide, 7 mm. thick, strongly curved, acute on the upper suture, strigose and mottled.

Rocky ridges, Upper Sonoran Zone; Inner Coast Ranges, San Benito County, to the Mount Pinos region, California. Type locality: near New Idria, California. April–May.

107. *Astragalus malacus* A. Gray. Soft Rattle-weed. Fig. 2881.*Astragalus malacus* A. Gray, *Proc. Amer. Acad.* 7: 336. 1868.*Hamosa malaca* Rydb. *Fl. Rocky Mts.* 496, 1063. 1917.

Perennial, cespitose, the stems ascending, usually less than 2 dm. long, whole plant villous with spreading hairs. Leaves 5–8 cm. long; leaflets 11–17, obovate to elliptic-obovate, 6–12 mm. long; peduncles stout, 4–6 cm. long; racemes many-flowered, 3–4 cm. long; calyx-tube cylindric-campanulate, 6–7 mm. long, white-villous with black hairs interspersed; teeth subulate, 3 mm. long; corolla purple, 15 mm. long; pod 2–3 cm. long, 5–6 mm. wide, strongly flattened laterally, somewhat curved, densely villous.

Gravelly soils, Upper Sonoran Zone; Blue Mountains, Oregon, and adjacent Idaho south, east of the Cascade Mountains and Sierra Nevada, to western Nevada, and the Mojave Desert, California. Type locality: near Carson City, Nevada. April.

Astragalus Minthorniae (Rydb.) Jepson, *Fl. Calif.* 2: 374. 1936. (*Hamosa Minthorniae* Rydb. *Bull. Torrey Club* 54: 15. 1927.) Stems erect or ascending from a stout root crown, 10–30 cm. high or sometimes shorter and tufted, strigose or short-villous with ascending hairs. Leaves 5–10 cm. long, erect; leaflets 11–19, obovate, 8–15 mm. long, silky-canescens; racemes 6–10 cm. long, well surpassing the leaves; calyx black-hairy, the tube 5–6 mm. long; corolla white except the purple-tipped keel, banner 12–15 mm. long; pod erect or ascending, straight or nearly so, shaggy-pilose, 2–2.5 cm. long, 4 mm. thick and wide, abruptly acute at apex. Southwestern Nevada and the New York Mountains, San Bernardino County, California. Doubtfully distinct from *Astragalus malacus* A. Gray. Best distinguished by the smaller flowers and more open racemes.

108. *Astragalus Layneae* Greene. Layne's Rattle-weed. Fig. 2882.

Astragalus Layneae Greene, Bull. Calif. Acad. 1: 156. 1885.

Hamosa Layneae Rydb. Bull. Torrey Club 54: 15. 1927.

Perennial, caespitose, stems usually only a few from the crown of the woody root, usually less than 1 dm. long, whole plant pilose with appressed or ascending hairs. Leaves 6–10 cm. long; leaflets 15–21, obovate, 6–15 mm. long; peduncles stout, 6–15 cm. long; racemes 5–10 cm. long, loosely flowered; calyx-tube cylindric-campanulate, 5–7 mm. long, black-hairy; teeth subulate-triangular, 1 mm. long; corolla pale lilac, tipped with purple, 12–15 mm. long; pod villous, 2.5–3.5 cm. long, 6–7 mm. wide, obcompressed, broadly sulcate dorsally, strongly curved, long-acuminate at apex.

Rocky hillsides, Lower Sonoran Zone; Mojave Desert, southern California, to southern Nevada and western Arizona. Type locality: Mojave Desert, southern California. April.

109. *Astragalus Andersonii* A. Gray. Anderson's Rattle-weed. Fig. 2883.

Astragalus Andersonii A. Gray, Proc. Amer. Acad. 6: 524. 1866.

Hamosa Andersonii Rydb. Bull. Torrey Club 54: 16. 1927.

Perennial, the stems usually numerous from the woody crown, mostly 2–3 dm. high, whole plant hoary with a dense ascending or somewhat appressed silky-villous pubescence. Leaves 5–7 cm. long; leaflets mostly 13–15, oblanceolate or narrowly obovate, acute or obtuse, 7–12 mm. long; stipules herbaceous, triangular-subulate, 3 mm. long; peduncles about equaling the leaves; racemes becoming loosely flowered, 4–6 cm. long; calyx-tube cylindric-campanulate, 5–6 mm. long, 3–4 mm. broad, white-villous; teeth subulate, 4–5 mm. long; corolla ochroleucous or tinged with pink, 10–12 mm. long; pod 15 mm. long, 4 mm. wide, compressed, arcuate, acute at apex, villous.

Gravelly sagebrush land, Upper Sonoran Zone; eastern base of the Sierra Nevada, western Nevada and California, from Lassen County to Inyo County, California. Type locality: near Carson City, Nevada. May–June.

110. *Astragalus succumbens* Dougl. Sprawling Rattle-weed. Fig. 2884.

Astragalus succumbens Dougl. ex Hook. Fl. Bor. Amer. 1: 151. 1831.

Astragalus dorychnioides Dougl. ex G. Don, Gen. Hist. Pl. 2: 151. 1832.

Phaca succumbens Piper, Contr. U.S. Nat. Herb. 11: 370. 1906.

Hamosa succumbens Rydb. Bull. Torrey Club 54: 14. 1927.

Perennial, caespitose, the stems decumbent or ascending, the central one usually erect, 2–4 dm. long, whole plant canescent with spreading pilose pubescence. Leaves 3–6 cm. long; leaflets 9–17, obovate to broadly oblanceolate, 6–12 mm. long; peduncles shorter than the leaves; racemes 2–3 cm. long; bracts subulate, 5–7 mm. long; calyx-tube cylindric-campanulate, 6–7 mm. long; teeth subulate, 3 mm. long, sparsely white-pilose with a few black hairs interspersed; corolla ochroleucous tinged with rose toward the base, 15–18 mm. long; pods glabrous, 30–35 mm. long, 4–5 mm. wide, strongly flattened laterally, the lower suture deeply and narrowly sulcate, slightly arcuate.

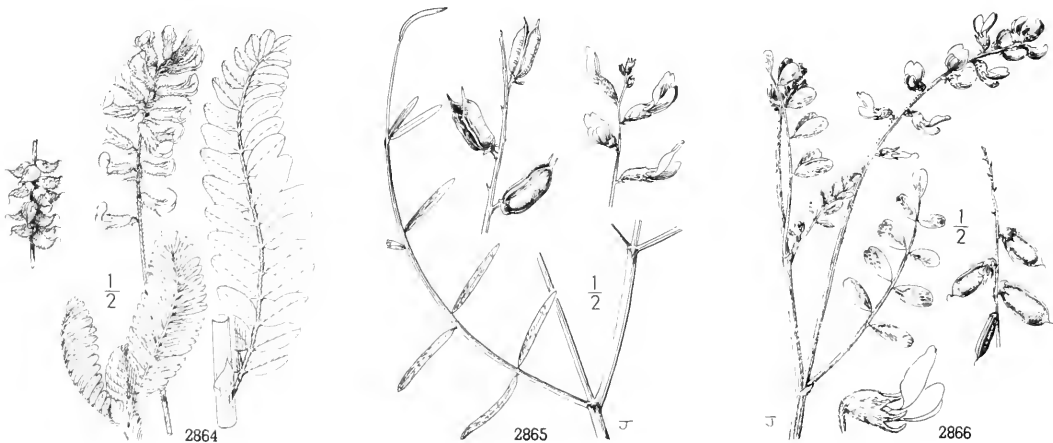
In sand and rocky hillsides, Upper Sonoran Zone; eastern Washington from Klickitat and Walla Walla Counties south to Gilliam and Umatilla Counties, eastern Oregon. Type locality: "On the barren grounds of the Columbia and near the Wallawallah River." May–June.

111. *Astragalus calycosus* Torr. King's Rattle-weed. Fig. 2885.

Astragalus calycosus Torr. ex S. Wats. Bot. King Expl. 66. pl. 10. f. 4–7. 1871.

Hamosa calycosa Rydb. Bull. Torrey Club 40: 50. 1913.

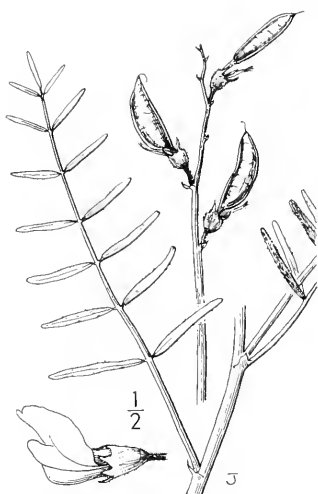
Perennial, caespitose, the stems several from the woody crown, very short, whole plant silvery-silky. Leaflets 1–5, oblong to oblanceolate, obtuse or acutish, 6–8 mm. long; peduncles slender, 2–4 cm. long, a little exceeding the leaves, 2–6-flowered; calyx-tube campanulate, 4 mm. long;



2864. *Astragalus Brauntonii*

2865. *Astragalus Serenoi*

2866. *Astragalus mohavensis*



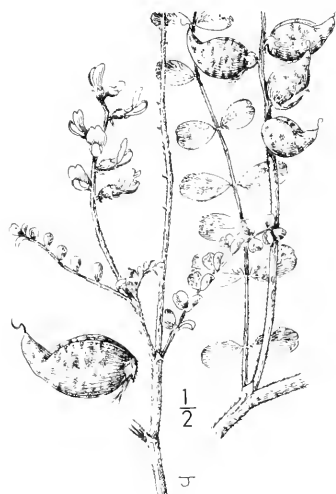
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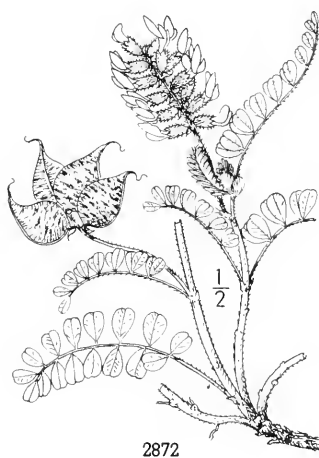
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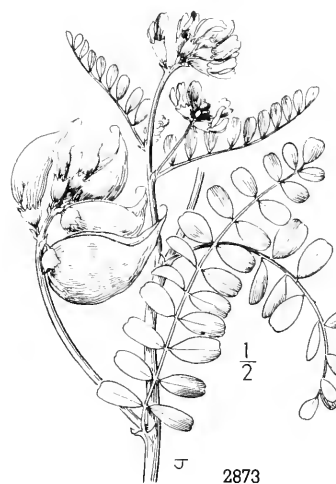
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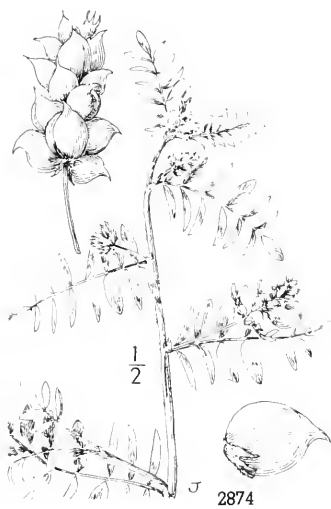
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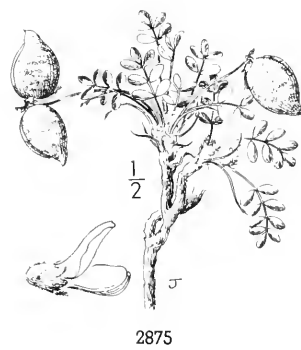
2872



2873



2874



2875

2867. *Astragalus pachypus*
 2868. *Astragalus Coulteri*
 2869. *Astragalus agninus*

2870. *Astragalus Arthu-Schottii*
 2871. *Astragalus Fremontii*
 2872. *Astragalus nigricalycis*

2873. *Astragalus tehachapiensis*
 2874. *Astragalus albifolius*
 2875. *Astragalus platytropis*

teeth subulate, scarcely 2 mm. long; corolla ochroleucous, 10 mm. long, the wings 2-lobed; pod strigose, sessile, oblong, straight, 15 mm. long, 4 mm. wide and 3 mm. thick, slightly sulcate dorsally, chartaceous.

Gravelly or rocky situations, Canadian to Upper Sonoran Zones; eastern slopes of the Sierra Nevada, and Inyo and White Mountains, California, to southern Idaho, Wyoming, and New Mexico. Type locality: western Nevada. June.

112. *Astragalus umbraticus* Sheldon. Silvan Rattle-weed. Fig. 2886.

Astragalus sylvaticus S. Wats. Proc. Amer. Acad. 23: 262. 1888. Not Willd.

Astragalus umbraticus Sheldon, Minn. Bot. Studies 1: 23. 1894.

Hamosa umbratica Rydb. Bull. Torrey Club 54: 19. 1927.

Perennial, stems several from the small crown, erect or ascending, 4-6 dm. high, with long internodes, nearly glabrous. Stipules lanceolate-subulate; leaves 5-8 cm. long; leaflets 17-21, oblong to oval, obtuse or retuse, 6-12 mm. long, thin, glabrous or nearly so; peduncles about 8 cm. long; racemes 2-8 cm. long; calyx-tube campanulate, 3 mm. long, black-hairy; teeth subulate, about 2 mm. long; corolla ochroleucous, 8 mm. long; pod linear, curved, about 12 mm. long, 3 mm. wide, glabrous, narrowly and deeply sulcate dorsally.

Open woods in rich soil, Transition Zone; southwestern Oregon, south to Humboldt County, California. Type locality: Glendale, Oregon. June.

113. *Astragalus bernardinus* M. E. Jones. San Bernardino Rattle-weed. Fig. 2887.

Astragalus bernardinus M. E. Jones, Proc. Calif. Acad. II. 5: 661. 1895.

Hamosa bernardina Rydb. Bull. Torrey Club 54: 19. 1927.

Perennial, the stems several from the small crown, broom-like, pale glaucous green, sparsely strigose. Leaves 7-10 mm. long; leaflets usually 13, rather distinct, linear, 5-15 mm. long, pale green and somewhat grayed with strigose pubescence; peduncles 5-10 cm. long; racemes 5-9 cm. long, the flowers rather distant; calyx-tube 3 mm. long, canescent with appressed pubescence and intermingling black hairs; teeth subulate, about 1 mm. long; corolla purple, 7 mm. long; pod linear, 25 mm. long, 3-4 mm. wide, erect, nearly straight, distinctly narrowed at base, glabrous, ventral suture acute, the dorsal rounded, 2-celled.

Desert ridges, Upper Sonoran Zones; desert slopes of the San Bernardino Mountains to the western base of the New York Mountains, southern California. Type locality: "Morongo King Mine, east side of San Bernardino Mountains, California, 5000 ft. alt." May.

114. *Astragalus tricarinatus* A. Gray. Triple-ribbed Rattle-weed. Fig. 2888.

Astragalus tricarinatus A. Gray, Proc. Amer. Acad. 12: 56. 1876.

Hamosa tricarinata Rydb. Bull. Torrey Club 54: 20. 1927.

Perennial with a stout woody root, the stems several from the short caudex, 2-4 dm. high, sparsely strigose. Leaves 10-15 cm. long; leaflets 17-35, oblong-oval, obtuse to retuse at apex, 6-15 mm. long, densely white-strigose beneath, less so above; peduncles 6-10 cm. long, sparsely strigose or glabrous; racemes 5-9 cm. long, loosely flowered; calyx sparsely black-hairy, the tube 4-5 mm. long, the teeth subulate, 2 mm. long; corolla white, 12 mm. long, the banner broadly obovate; pod linear in outline, slightly arcuate, glabrous, 25-35 mm. long, 4-5 mm. wide and as thick, broadly sulcate on the lower suture, and deeply cordate in cross-section.

Dry desert washes, Lower Sonoran Zone; base of the San Bernardino Mountains on the desert slopes, California. Type locality: White Water, San Bernardino County, California. April-May.

115. *Astragalus drepanolobus* A. Gray. Sickie-pod Rattle-weed. Fig. 2889.

Astragalus drepanolobus A. Gray, Proc. Amer. Acad. 19: 75. 1883.

Hamosa drepanoloba Rydb. Bull. Torrey Club 54: 21. 1927.

Perennial from slender rootstocks, stems decumbent, several from the scarcely woody crown, decumbent, 2-3 dm. long, sparsely strigose. Leaves 3-4 cm. long; leaflets 7-9, obovate, rounded or retuse at apex, 5-8 mm. long, somewhat canescent when young, becoming green and sparsely strigose when mature; peduncles 3 cm. long, about equaled by the racemes; flowers several to many, small; calyx-tube campanulate, oblique, scarcely over 2 mm. long, white-hairy; teeth subulate, a little shorter than the tube; corolla white, veined with purple, 6-7 mm. long; pod sparsely strigose, linear, curved into a semicircle, 1 cm. long, 3 mm. wide, deeply and narrowly sulcate dorsally.

On alluvial gravelly soils, Upper Sonoran Zones; rarely collected; Bingen, Washington, John Day Valley, eastern Oregon, and Washoe Valley, Nevada. Type locality: "On John Day's River at Scotts Bridge," Oregon. April-May.

116. *Astragalus Congdonii* S. Wats. Congdon's Rattle-weed. Fig. 2890.

Astragalus Congdonii S. Wats. Proc. Amer. Acad. 20: 360. 1885.

Hamosa Congdonii Rydb. Bull. Torrey Club 54: 20. 1927.

Perennial, the stems several, ascending or somewhat decumbent, 20-35 cm. long, plant, except the inflorescence, white-woolly or the stems glabrate. Leaves 5-8 cm. long; leaflets 17-23, elliptic to narrowly oblong-oblancheolate, 5-10 mm. long, obtuse to retuse; peduncles 8-10 cm. long; racemes 3-8 cm. long, rather loosely flowered; calyx and rachis conspicuously black-hairy; calyx-tube campanulate, scarcely 4 mm. long; teeth subulate, 2 mm. long; corolla white, about 15 mm. long; pods reflexed, slightly curved, linear, 15-18 mm. long, 2-3 mm. wide, acute at apex, pubescent, the dorsal suture sulcate.

On the border line between the Upper Sonoran and Transition Zones; foothills of the Sierra Nevada, Amador and Mariposa Counties, California. Type locality: Hites Cove, Mariposa County, California. April-May.

117. *Astragalus álbens* Greene. White Rattle-weed. Fig. 2891.*Astragalus albens* Greene, Bull. Calif. Acad. 1: 156. 1885.*Hamosa albens* Rydb. Bull. Torrey Club 54: 22. 1927.

Perennial, whole plant silver with appressed silky pubescence, the stems numerous, spreading, ascending, 2–4 dm. long. Leaves 9–11, elliptic-obovate, 7–10 mm. long, acutish or obtuse; peduncles 2.5–5 cm. long; racemes short, about 1–2 cm. long, rather densely flowered; calyx-tube scarcely 3 mm. long, white-silky; teeth subulate, about as long as the tube; corolla purple, 8 mm. long; pods broadly linear, narrowed at base to a short stipe, strongly curved, 15–20 mm. long, 3–4 mm. wide, coriaceous, strongly reticulate, strigose, ribbed along the ventral suture, broadly sulcate dorsally except toward the apex.

Rocky canyons, Lower Sonoran Zone; Mojave and Colorado Deserts, California, to southern Nevada. Type locality: Mojave Desert. April–May.

118. *Astragalus Clevelandii* Greene. Cleveland's Rattle-weed. Fig. 2892.*Astragalus Clevelandii* Greene, Bull. Torrey Club 9: 121. 1882.*Hamosa Clevelandii* Rydb. Bull. Torrey Club 54: 334. 1927.

Perennials from a woody root, the stems slender, erect or ascending, 3–6 dm. high, glabrous. Leaves 4–10 cm. long, leaflets 11–19, narrowly elliptic, obtuse or acutish, 5–10 mm. long, green and glabrous above, sparsely strigose beneath; peduncles erect, 5–15 cm. long; racemes often 10–15 cm. long in fruit, many-flowered; calyx-tube broadly campanulate, scarcely 2 mm. long, white-hairy; teeth subulate, equaling the tube; corolla white, 5 mm. long; pods reflexed, lanceolate, 5–7 mm. long, 2 mm. wide near the base and gradually narrowed to the acuminate apex, strongly sulcate dorsally, glabrous.

Gravelly or rocky soils, Upper Sonoran Zone; Inner Coast Ranges, Lake County, California. Type locality: Indian Valley, Lake County. June–July.

119. *Astragalus Bruceae* (M. E. Jones) Abrams. Bruce's Rattle-weed. Fig. 2893.*Astragalus tener* var. *Brucae* M. E. Jones, Rev. N. Amer. Astrag. 268. 1923.

Annual, branching from the base, the branches 5–10 cm. long, sparsely strigose. Leaflets mostly 7–9, cuneate or oblong, retuse, 4–6 mm. long, strigose beneath, sparsely so or glabrate above; peduncles very slender, 2.5–3.5 cm. long; flowers short-racemose, 1–6; calyx-tube campanulate, about 2.5 mm. long, black-hairy; teeth subulate, 1 mm. long; corolla purple, 7 mm. long; pod linear-oblong, falcate, barely 2 cm. long, 4 mm. wide, acute at apex, distinctly flattened laterally, shallowly and narrowly sulcate dorsally, glabrous and mottled.

Heavy clay soils, Upper Sonoran Zone; Sacramento Valley and adjoining foothills, Butte and Tehama Counties, California. Type locality: plains of Butte County, California. March–April.

120. *Astragalus téner* A. Gray. Slender Rattle-weed. Fig. 2894.*Astragalus hypoglottis* var. *strigosa* Kell. Proc. Calif. Acad. 2: 115. 1861.*Astragalus tener* A. Gray, Proc. Amer. Acad. 6: 206. 1864.*Astragalus strigosus* Sheldon, Minn. Bot. Studies 9: 24. 1894.*Astragalus Titi* Eastw. Bull. Torrey Club 32: 195. 1905.*Astragalus tener* var. *rattanoides* M. E. Jones, Rev. N. Amer. Astrag. 268. 1923.*Hamosa Kelloggiana* Rydb. Bull. Torrey Club 54: 323. 1927.

Slender annual, branching from the base, the stems glabrous or sparingly strigose. Leaflets mostly 9–13, linear and acute to narrowly oblong and truncate or retuse, 5–12 mm. long, green, very sparingly strigose or glabrate, peduncles 3–7 cm. long; flowers 2 to many, subcapitate; calyx-tube 2 mm. long, black-hairy; teeth about 1.5 mm. long; corolla purple, 7–9 mm. long; pod 10–15 mm. long, 2 mm. wide, straight or nearly so, not attenuate at base, acute or short-acuminate at apex, narrowly sulcate dorsally, strigose or rarely glabrous.

Low ground, usually in saline soils near the coast, Upper Sonoran Zone; San Francisco Bay region south to Los Angeles. Type locality: California. Collected by Douglas probably in the vicinity of San Francisco or Monterey. March–May.

121. *Astragalus Clariànus* Jepson. Clara Hunt's Rattle-weed. Fig. 2895.*Astragalus Clarianus* Jepson, Man. Fl. Pl. Calif. 578. 1925.*Astragalus Rattanii* var. *Clarianus* Jepson, Fl. Calif. 2: 379. 1936.

Annual, branching from the base, the branches 6–20 cm. long, sparsely strigose. Leaflets 7–11, oblong-cuneate, truncate or retuse, 6–10 mm. long, sparsely strigose below, glabrate above; peduncles 2.5–5 cm. long; flowers 4–10, subcapitate; calyx-tube campanulate, 2 mm. long, black-hairy; teeth subulate, 1 mm. long; corolla pale lavender or white tipped with dark purple, 7–8 mm. long; pod strongly arcuate, narrowly linear, 2.5–3 cm. long, 1.5–2 mm. wide, acuminate at apex, attenuate to a stipe-like base, strigose.

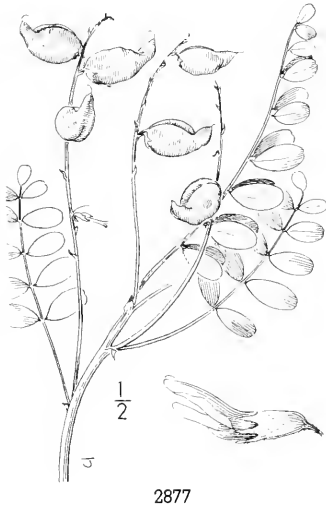
Clay soils, Upper Sonoran Zone; northern Coast Ranges and Sacramento Valley, California. Type locality: near St. Helena, California. April–June.

122. *Astragalus Rattànii* A. Gray. Rattan's Rattle-weed. Fig. 2896.*Astragalus Rattanii* A. Gray, Proc. Amer. Acad. 19: 75. 1883.

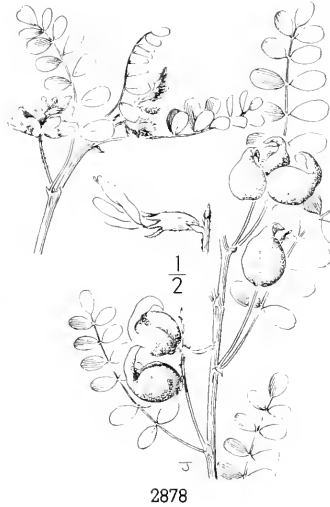
Annual, branching from the base, the stems 10–35 cm. high, sparsely strigose. Leaflets 9–15, cuneate-obovate to oblong, obtuse or retuse, 5–10 mm. long, sparingly strigose or glabrate; peduncles 5–7 cm. long; flowers subcapitate, 3 to many; calyx-tube 2.5 mm. long, black-hairy;



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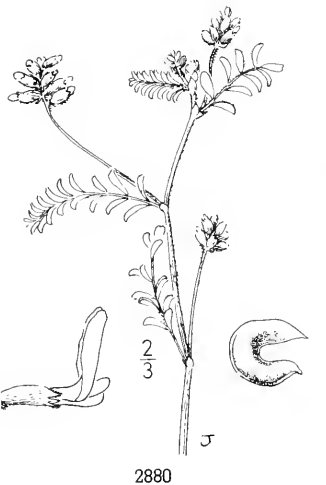
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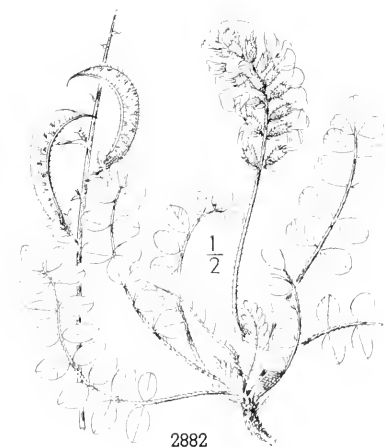
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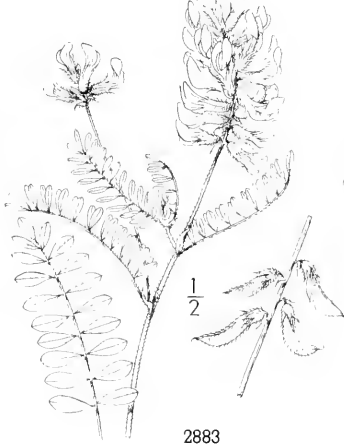
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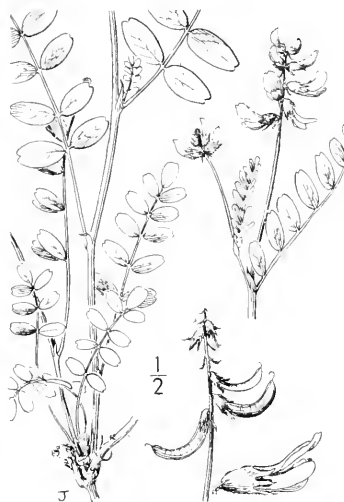
2876. *Astragalus araneosus*
2877. *Astragalus salinus*
2878. *Astragalus lentiginosus*

2879. *Astragalus ineptus*
2880. *Astragalus idriensis*
2881. *Astragalus malacus*

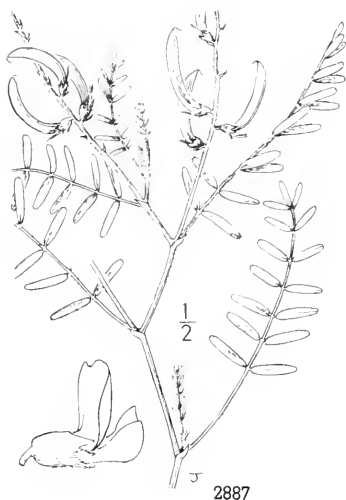
2882. *Astragalus Layneae*
2883. *Astragalus Andersonii*
2884. *Astragalus succumbens*



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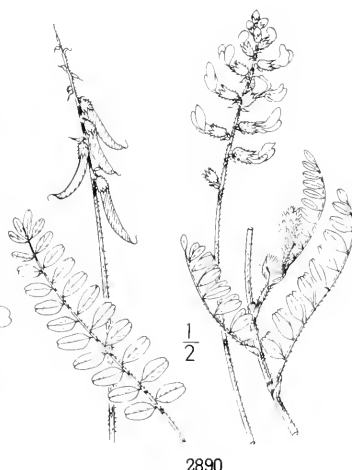
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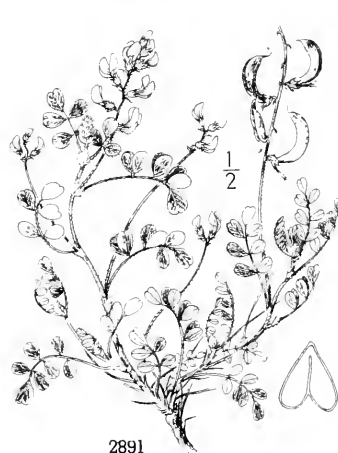
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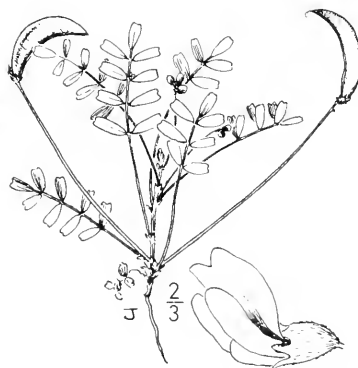
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2885. *Astragalus calycosus*2886. *Astragalus umbraticus*2887. *Astragalus bernardinus*2888. *Astragalus tricarlinatus*2889. *Astragalus drepanolobus*2890. *Astragalus Congdonii*2891. *Astragalus albens*2892. *Astragalus Clevelandii*2893. *Astragalus Bruceae*

teeth subulate, 1.5 mm. long; corolla violet-purple to white, 8–12 mm. long; pods nearly straight or somewhat curved, at least toward the base, 3–4.5 cm. long, 2 mm. wide and as thick, attenuate at apex, and somewhat so at base, very narrowly sulcate dorsally, strigose.

Stream banks, mainly Humid Transition Zone; Humboldt and Mendocino Counties, California. Type locality: Bug Creek, Humboldt County, California. June–July.

123. *Astragalus austrinus* (Small) Schulz. Sonora Rattle-weed. Fig. 2897.

Astragalus Nuttallianus var. *trichocarpus* Torr. & Gray, Fl. N. Amer. 1: 334. 1838.

Astragalus Nuttallianus var. *canescens* Torr. & Gray, Pacif. R. Rep. 2: 163. 1856.

Hamosa austrina Small, Fl. S.E. U.S. 618. 1903.

Astragalus pertenuis Greene, Leaflets Bot. Obs. 2: 42. 1910.

Astragalus austrinus Schulz, 500 Wild Fl. San Antonio 104. 1922.

Hamosa Emoryana Rydb. Bull. Torrey Club 54: 327. 1927.

Hamosa imperfecta Rydb. Bull. Torrey Club 54: 329. 1927.

Annual, stems branched at the base, decumbent, 0.5–2.5 dm. long, pubescence sparingly to densely strigose. Leaves 2–5 cm. long; leaflets 9–11, oblong to linear, usually acute; peduncles slender, 3–10 cm. long, surpassing the leaves; inflorescence 1–4-flowered, subcapitate, calyx white-strigose, 3–5 mm. long, teeth subulate, equaling or nearly equaling the tube; flowers white tinged with purple, 4–6 mm. long; pod 1–1.5 cm. long, 2 mm. wide, strigose to glabrous, more or less arcuate, sometimes incompletely 2-celled.

Western Nevada and the Death Valley region to Lower California, Sonora, and western Texas. Type locality: Fronteras, Sonora. March–April.

124. *Astragalus acutiróstris* S. Wats. Beaked Rattle-weed. Fig. 2898.

Astragalus acutirostris S. Wats. Proc. Amer. Acad. 20: 360. 1885.

Oxytropis acutirostris M. E. Jones, Proc. Calif. Acad. II. 5: 677. 1895.

Aragallus acutirostris Heller, Cat. N. Amer. Pl. 4. 1898.

Hamosa acutirostris Rydb. Bull. Torrey Club 54: 331. 1927.

Astragalus Nuttallianus var. *acutirostris* Jepson, Fl. Calif. 2: 379. 1936.

Annual, the stems several, decumbent, 1–2 dm. long, whole plant cinereous, with upwardly curved or somewhat appressed short pubescence. Leaves 1.5–2 cm. long; leaflets 9–13, oblong-ob lanceolate, usually retuse, 4–10 mm. long, 2–3 mm. wide; peduncles very slender, 3–6 cm. long; racemes loosely 2–8-flowered; calyx-tube scarcely more than 1 mm. long, usually black-hairy; teeth subulate, 1 mm. long; corolla white or tinged with purple, 5 mm. long; keel with an acute beak; pods spreading or ascending, linear, only slightly curved, about 15 mm. long, 2.5 mm. wide, abruptly acute at both ends, deeply and narrowly sulcate dorsally, strigose.

Dry desert slopes, Lower Sonoran Zone; Mojave Desert, California, and southern Nevada. Type locality: near Brown's Ranch, Mojave Desert, California. April–May.

125. *Astragalus Bolánderi* A. Gray. Bolander's Locoweed. Fig. 2899.

Astragalus Bolanderi A. Gray, Proc. Amer. Acad. 7: 337. 1868.

Astragalus supervacaneus Greene, Erythraea 1: 221. 1893.

Hesperonix Bolanderi Rydb. N. Amer. Fl. 24: 440. 1924.

Stems several from the crown of a woody rootstock, decumbent or ascending, 3–5 dm. long, sparsely strigose. Leaflets mostly 17–19, linear-oblong, 7–10 mm. long, sparsely woolly-pubescent; peduncles 5–10 cm. long; racemes subcapitate, rather densely flowered; calyx-tube 4 mm. long, sparsely pubescent, the teeth triangular-subulate, 2 mm. long; corolla 12 mm. long, white or yellowish; pod inflated, 15 mm. long, 7–8 mm. wide and thick, gradually narrowed from the rounded base to the apex, and strongly arched, thin, coriaceous, reticulate, glabrous, lower suture sulcate, 2-celled, except the flattened acute apex; stipe slender, 5–7 mm. long.

Granitic gravels and sand, mainly Canadian Zone; Sierra Nevada, California. Type locality: "Dry ground, at Ostrander's Ranch, Yosemite Valley." June–Aug.

126. *Astragalus áccidens* S. Wats. Rogue River Rattle-weed. Fig. 2900.

Astragalus accidens S. Wats. Proc. Amer. Acad. 22: 471. 1887.

Hesperonix accidens Rydb. N. Amer. Fl. 24: 438. 1929.

Stems from a slender woody rootstock, decumbent or ascending, 3–4 dm. high, sparingly pubescent, leaflets mostly 21–25, oblong-elliptic, retuse, 10–15 mm. long, sparsely pubescent with upwardly curved hairs, peduncles 6–8 cm. long; racemes about 2 cm. long; calyx-tube 3–4 mm. long, black-hairy; teeth triangular-subulate, scarcely 2 mm. long; corolla white, 15 mm. long; body of the pod 8–12 mm. long, equaled by the slender stipe, half-ovoid, about 5 mm. wide and nearly as thick, coriaceous, transversely reticulate, strigose, 2-celled.

Dry open woods, Arid Transition Zone; Cow Creek Mountains and hills about Rogue River Valley, southern Oregon. Type locality: Cow Creek Mountains. May–June.

127. *Astragalus Watsonii* Sheldon. Watson's Locoweed. Fig. 2901.

Astragalus Hendersonii S. Wats. Proc. Amer. Acad. 22: 471. 1887. Not Baker 1879.

Astragalus Watsonii Sheldon, Minn. Bot. Studies 1: 23. 1894.

Astragalus pacificus Sheldon, Minn. Bot. Studies 1: 174. 1894.

Astragalus accidens var. *Hendersonii* M. E. Jones, Rev. N. Amer. Astrag. 164. 1923.

Stems several, decumbent, from a slender woody rootstock, 3–4 dm. high, sparingly pubescent with upcurved hairs. Leaflets mostly 21–25, oblong-elliptic, retuse, about 1 cm. long, loosely

appressed-pubescent; peduncles 6–8 mm. long; racemes about 25 mm. long; calyx-tube 3–4 mm. long, black-hairy; teeth subulate, 2.5 mm. long; corolla white, 12 mm. long; stipe about 1 cm. long; body of pod half-ovoid, about 2 cm. long, 1 cm. wide and nearly as thick, coriaceous and corrugately roughened with transverse ridges, ribbed on both sides by the prominent sutures.

Open woods, Arid Transition Zone; Jackson and Josephine Counties, Oregon, to Tehama County, California. Type locality: open woods near Ashland, Oregon. April.

128. *Astragalus vallis* M. E. Jones. Snake River Rattle-weed. Fig. 2902.

Astragalus vallis M. E. Jones, Contr. West. Bot. No. 10: 59. 1902.

Hesperonix vallis Rydb. N. Amer. Fl. 24: 439. 1929.

Stems stout, several from the crown of a woody rootstock, decumbent or ascending, about 3 dm. long, glabrous. Leaflets elliptic, 6–15 mm. long, glabrous or sparsely pubescent on the midrib and margins; peduncles stout, 5–8 cm. long; racemes short; calyx-tube 5 mm. long, black-hairy; teeth subulate, 4–5 mm. long; corolla white, 18 mm. long; pods 35–50 mm. long, 10–12 mm. thick, 4–5 mm. wide, oblong-ovoid, abruptly acuminate at apex, narrowed at base with firm rather thick cartilaginous walls, 2-celled; stipe 10–12 mm. long.

Dry hillsides, Snake River Canyon and Pine Creek, eastern Oregon. Type locality: Snake River Canyon, near Ballard's Landing, Oregon. April–May.

129. *Astragalus Mortonii* Nutt. Morton's Locoweed. Fig. 2903.

Astragalus Mortonii Nutt. Journ. Acad. Phila. 7: 19. 1834.

Astragalus spicatus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 336. 1838.

Astragalus canadensis var. *Mortonii* S. Wats. Bot. King Expl. 68. 1871.

Tragacantha Mortonii Kuntze, Rev. Gen. Pl. 2: 946. 1891.

Phaca Mortonii Piper, Contr. U.S. Nat. Herb. 11: 372. 1906.

Astragalus Torreyi Rydb. N. Amer. Fl. 24: 448. 1929.

Perennial, the stems few to several, ascending, 4–6 dm. high, stout, glabrous or sparsely strigose. Leaves 8–12 cm. long; leaflets 13–21, elliptic to oblong-elliptic, 15–30 mm. long, obtuse or rounded at apex, sparsely strigose beneath, glabrous or nearly so above; peduncles stout, often 10–12 cm. long; racemes densely flowered, 3–6 cm. long; calyx campanulate-strigose, often intermingled with black hairs; tube 5 mm. long; teeth triangular-subulate, 2 mm. long; corolla 15 mm. long, ochroleucous; pods oblong, about 12 mm. long, 4 mm. thick, the lower shallowly sulcate, the upper suture prominent, chartaceous, glabrous or sparsely strigose.

Open forests, Transition and Canadian Zones; eastern Washington to northeastern California, Idaho, and Utah. Type locality: "About the sources and upper branches of the Missouri." June–Aug.

Astragalus brévidens Rydb. N. Amer. Fl. 24: 450. 1929. A closely related species or possibly subspecies with short white-villous pubescence on the calyx. Baker County, Oregon, and adjacent Washington.

130. *Astragalus striatus* Nutt. Striate Locoweed. Fig. 2904.

Astragalus adsurgens of Amer. authors. Not Pall.

Astragalus nitidus Dougl. ex Hook. Fl. Bor. Amer. 1: 149, as a synonym. 1830.

Astragalus striatus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 330. 1838.

Perennial, the stems several from the short branching crown, decumbent, 2–3 dm. long, pallid, sparsely strigose. Leaflets usually 13, narrowly elliptic-lanceolate to linear-lanceolate, 8–12 mm. long, silky-strigose; peduncles stout, 5–15 cm. long; racemes spicate, densely flowered, 2–5 cm. long; calyx cylindric, strigose with or without interspersed black hairs, the tube 5–6 cm. long, the teeth subulate, 3 mm. long; corolla purple or white, 14–15 mm. long; pods narrowly ellipsoid, 7–10 mm. long, 3–4 mm. wide, chartaceous, silky-strigose, the lower suture sulcate.

Dry plains and hills, Arid Transition and Upper Sonoran Zones; British Columbia to Medical and Silver Lakes, Washington, and Harney Lake, Oregon, east to Saskatchewan, Minnesota, and Colorado. Type locality: "Plains and hills of the Platte and Missouri." June–July.

131. *Astragalus goniatus* Nutt. Angle-stemmed Locoweed. Fig. 2905.

Astragalus hypoglottis of Amer. authors. Not L.

Astragalus goniatus Nutt. in Torr. & Gray, N. Amer. Fl. 1: 330. 1838.

Perennial, with a woody rootstock; stems 1–2 dm. high, decumbent or ascending, glabrous or sparingly strigose. Leaflets 15–21, linear-oblong to elliptic, obtuse or retuse, 5–10 mm. long, sparingly strigose or glabrate; peduncles about 5 cm. long; racemes spicate, densely flowered, 2–3 cm. long; calyx-tube 6–7 mm. long, usually with black hairs, the teeth subulate, 2–3 mm. long; corolla 15 mm. long; purple pod ovoid, about 1 cm. long, long-villous.

Meadows and river valleys, Arid Transition Zone; eastern Washington to northeastern California, Minnesota, and New Mexico. Type locality: "Rocky Mountains, near the sources of the Platte." May–July.

132. *Astragalus Spaldingii* A. Gray. Spalding's Locoweed. Fig. 2906.

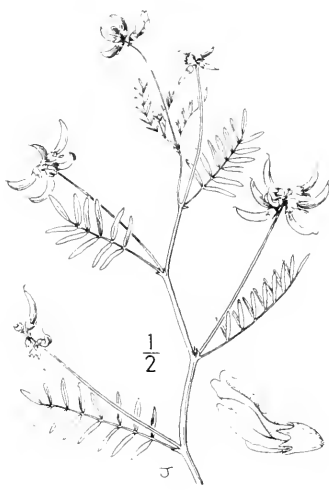
Astragalus Spaldingii A. Gray, Proc. Amer. Acad. 6: 524. 1865.

Tragacantha Spaldingii Kuntze, Rev. Gen. Pl. 2: 948. 1891.

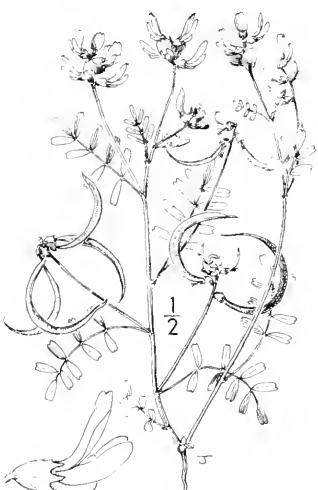
Phaca Spaldingii Piper, Contr. U.S. Nat. Herb. 1: 370. 1906.

Astragalus tighensis M. E. Peck, Proc. Biol. Soc. Wash. 49: 110. 1936.

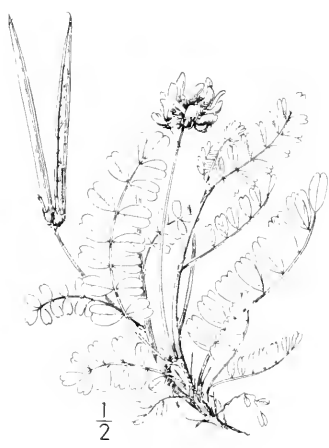
Perennial, the stems tufted from the crown of a woody rootstock, decumbent, rather slender, 3–6 dm. long, the entire plant white-villous. Leaflets mostly 19–25, narrowly oblong-lanceolate, acute, 5–8 mm. long; peduncles 4–10 cm. long; racemes spicate, densely flowered, 2–3 cm. long, becoming elongated and looser in fruit; calyx-tube 3 mm. long, long-villous; teeth subulate, equaling or slightly exceeding the tube; corolla ochroleucous, 7–8 mm. long; pod erect or ascending, long-



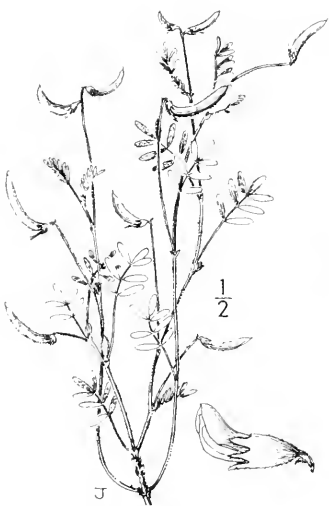
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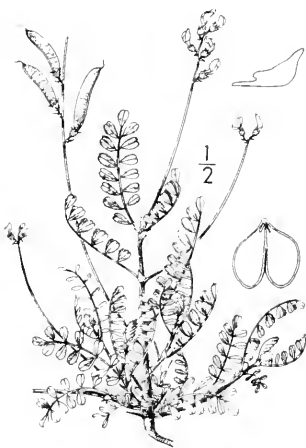
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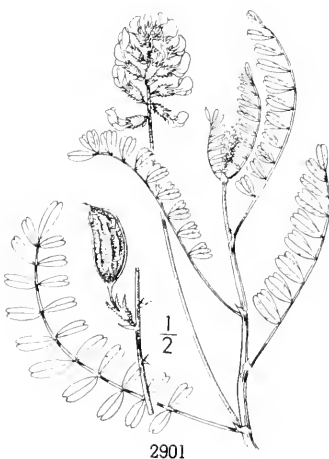
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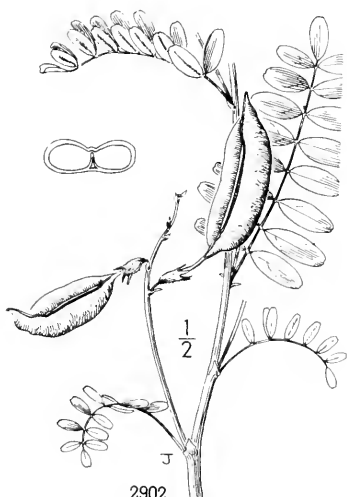
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2894. *Astragalus tener*

2895. *Astragalus Clarianus*

2896. *Astragalus Rattanii*

2897. *Astragalus austrinus*

2898. *Astragalus acutirostris*

2899. *Astragalus Bolanderi*

2900. *Astragalus accidens*

2901. *Astragalus Watsonii*

2902. *Astragalus vallis*

ovoid, 5–7 mm. long, short-beaked, straight, white-villous, lower suture broadly and shallowly sulcate, cordate in cross-section.

Hills and plains, Arid, Transition Zone; eastern Washington to northeastern California and western Idaho. Type locality: "Clearwater" River, Idaho. May–July.

133. *Astragalus Austiniae* A. Gray. Austin's Locoweed. Fig. 2907.

Astragalus Austiniae A. Gray, Bot. Calif. 1: 156. 1876.

Cespitose perennial, the stems rarely over 2–5 cm. long, densely white-silky. Leaves about 3 cm. long including the slender elongated petiole; leaflets 9–17, narrowly elliptic-lanceolate, acute and apiculate, 5–10 mm. long, silky-pubescent; peduncle slender, longer than the leaves; racemes subcapitate, 6–12-flowered; calyx-tube campanulate, white-villous, 3 mm. long, the teeth subulate, equaling the tube; corolla ochroleucous, 6 mm. long, scarcely surpassing the calyx-teeth; pod ovoid, chartaceous, 4 mm. long, almost circular in cross-section, hoary-pubescent.

Dry rocky ridges, northern Sierra Nevada, California. Type locality: summit of Mount Stanford (Castle Peak), Nevada County, California. June–Aug.

134. *Astragalus Lyallii* A. Gray. Lyall's Locoweed. Fig. 2908.

Astragalus Lyallii A. Gray, Proc. Amer. Acad. 6: 195. 1865.

Phaca Lyallii Piper, Contr. U.S. Nat. Herb. 11: 370. 1906.

Tragacantha Lyallii Kuntze, Rev. Gen. Pl. 2: 943. 1891.

Perennial, from a stout woody root, the stems several, 1–3 dm. high, ascending, whole plant cinereous or hoary with a more or less dense villous pubescence with mostly ascending hairs. Leaflets 15–21, narrowly elliptic to linear-lanceolate, 5–15 mm. long, acute; peduncles slender, 4–7 cm. long; fruiting racemes 4–8 cm. long; flowers scattered, somewhat secund, reflexed; calyx-tube short-campanulate, 1.5 mm. long, densely white-villous, the teeth filiform-subulate, 4 mm. long; corolla yellow or white, 7 mm. long; pod ovoid, 6–7 mm. long, triangular-cordate in cross-section, densely white-villous.

Sandy or gravelly soils, Upper Sonoran Zone; Kittitas and Yakima Counties, Washington, to Elmore County, Idaho. Type locality: "Upper Yakima River," Washington. May–July.

135. *Astragalus lentiformis* A. Gray. Lens-pod Locoweed. Fig. 2909.

Astragalus lentiformis A. Gray, Bot. Calif. 1: 156. 1876.

Tragacantha lentiformis Kuntze, Rev. Gen. Pl. 2: 943. 1891.

Perennial from a woody root, the stems several from the crown, prostrate, much branched, 1–3 dm. long, slender, hoary with appressed-villous pubescence. Leaflets 11–15, obovate to oblong-spatulate, 6–10 mm. long, retuse, silky-villous; peduncles many, 1–2 cm. long; racemes usually longer than the peduncles, several to many-flowered, calyx-tube bowl-shaped, arched, 2 mm. long, woolly, the teeth subulate, scarcely equaling the tube; corolla white, about 5 mm. long; pods broadly oblong, 6 mm. long, 3–4 mm. high, woolly-pubescent, lenticular, lower suture slightly sulcate.

Sagebrush-covered hills, Upper Sonoran Zone; eastern Oregon (Crook County) to northeastern California (Sierra County). Type locality: "Sierra Nevada, in Clover Valley," Sierra County, California. May–Aug.

Astragalus Péckii Piper, Proc. Biol. Soc. Wash. 37: 92. 1924. Leaflets acute, the terminal one but poorly developed, strigose-canescens; pods strigose, 7 mm. long, acute at both ends. Known only from the type locality, McKenzie Pass, Crook County, and from Deschutes River (Cusick), Oregon.

136. *Astragalus Lemmonii* A. Gray. Lemmon's Locoweed. Fig. 2910.

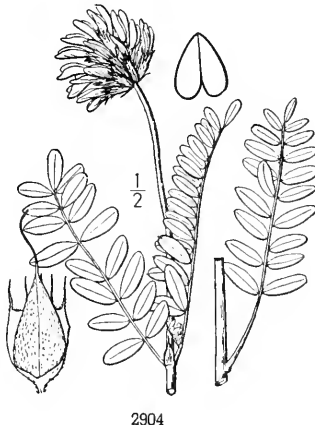
Astragalus Lemmonii A. Gray, Proc. Amer. Acad. 8: 626. 1873.

Tragacantha Lemmonii Kuntze, Rev. Gen. Pl. 2: 943. 1891.

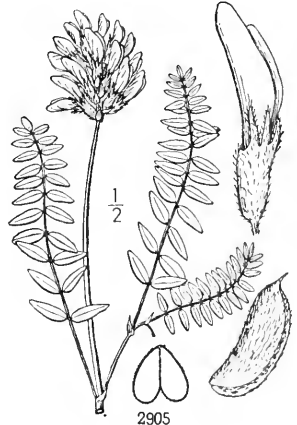
Perennial, from a somewhat fleshy taproot, the stems usually many from the crown, slender,



2903. *Astragalus mortonii*



2904. *Astragalus striatus*



2905. *Astragalus goniatus*

herbaceous to the base, 2–5 dm. long, prostrate, very sparsely strigose. Leaflets mostly 11–13, narrowly linear-lanceolate, acute, 4–8 mm. long, sparingly appressed-pubescent; peduncles slender, mostly 1–2 cm. long; racemes subcapitate, several-flowered; calyx-tube campanulate, silky-villous, 4 mm. high, the alternate subulate teeth equaling or longer than the tube; corolla about 6 mm. long, ochroleucous tinged with purple; pod strigose, oblong-ovoid, about 7 mm. long, the lower suture shallowly sulcate, cordate in cross-section, acute at apex and short-mucronate.

Dry sagebrush-covered hillsides, Upper Sonoran Zone; southeastern Oregon (Klamath County) to northeastern California (Sierra County). Type locality: Sierra Valley, California. May–Aug.

137. *Astragalus Brèweri* A. Gray. Brewer's Locoweed. Fig. 2911.

Astragalus Breweri A. Gray, Proc. Amer. Acad. 6: 207. 1864.

Tragacantha Breweri Kuntze, Rev. Gen. Pl. 2: 943. 1891.

Annual, the stems ascending or decumbent, 1–2 dm. high, sparsely strigose with white hairs or with white and black intermingling. Leaflets usually 9, cuneate-obovate, rounded or retuse at apex, 5–10 mm. long, sparsely strigose beneath, glabrous above; peduncles 2–8 cm. long, rather slender; flowers in several-flowered heads; calyx-tube campanulate, 4 mm. high, densely black-hairy with or without intermingling white hairs, the teeth subulate, about equaling the tube; corolla 8–10 mm. long, purple, the banner with a yellow central spot; pods sessile, the body oblique, half-ovoid, about 7 mm. long, 3-sided, sulcate on the lower suture, silky-pubescent, tipped with a slender beak about equaling the body.

Grassy slopes and fields, Upper Sonoran and Humid Transition Zones; California Coast Ranges, from Mendocino and Lake Counties to Marin County. Type locality: "Sonoma Valley, common in fields." April–July.

138. *Astragalus dispèrmus* A. Gray. Desert Dwarf Locoweed. Fig. 2912.

Astragalus dispèrmus A. Gray, Proc. Amer. Acad. 13: 365. 1878.

Hesperastragalus dispèrmus Heller, Muhlenbergia 1: 137. 1906.

Annual, branching from the base, the stems slender, 1–2 dm. high, strigose. Leaves 2–4 cm. long; leaflets mostly 9–13, oblong-cuneate, retuse, 4–6 mm. long, strigose and more or less canescent; peduncles slender, 2.5–5 cm. long; flowers in a short dense spike; calyx densely white-villous, 4 mm. long, the tube shorter than the subulate teeth; corolla about 5 mm. long, little exceeding the calyx, varying from white to purple; pods scarcely equaling the calyx, deeply and narrowly sulcate, the two lobes approximate, conspicuously rugose, short-pubescent, or rarely glabrous.

Dry sandy soils, Sonoran Zones; desert regions of southern California and Arizona. Type locality: Wickenburg, Arizona. April–May.

139. *Astragalus didymocàrpus* Hook. & Arn. Common Dwarf Locoweed. Fig. 2913.

Astragalus didymocarpus Hook. & Arn. Bot. Beechey 334.

Hesperastragalus didymocarpus Heller, Muhlenbergia 2: 87. 1905.

Hesperastragalus compactus Heller, Muhlenbergia 2: 218. 1906.

Hesperastragalus obispensis Rydb. Bull. Torrey Club 53: 167. 1926.

Hesperastragalus Milesianus Rydb. Bull. Torrey Club 53: 169. 1926.

Slender annual, branching from the base; the stems 1–3 dm. high, sparsely strigose. Leaves 2–6 cm. long; leaflets linear to linear-oblong, 4–12 mm. long, retuse, more or less cinereous with an upwardly appressed short pubescence; peduncles slender, 1.5–3 cm. long; flowers capitate or in short spikes; calyx about 3 mm. long, the lobes villous with white and black hairs, equaling the tube; corolla about 4 mm. long, cream-white or tinged with purple; pods 3.5 mm. long, scarcely exserted beyond the calyx, and not reflexed, prominently ridged transversely or diagonally, minutely and sparsely puberulent, or rarely glabrous.

Dry gravelly or sandy soils, Upper Sonoran Zone; Coast Ranges and the Great Valley, central California, to northern Lower California. The glabrous-podded form is *Hesperastragalus obispensis* Rydb. and a form of the Sierra foothills with a longer and more dense pubescence on the pods is *Hesperastragalus compactus* Heller. Type locality: coastal California. March–May.

Astragalus catalinènsis Nutt. Proc. Acad. Phila. 4: 9. 1848. Perhaps too closely related to *Astragalus didymocarpus* to be considered a distinct species. Differs principally in the smaller flowers, the corolla being scarcely 3 mm. long, and in the longer hairs on the pods. Originally discovered on Santa Catalina Island, but also occurs about San Diego and in northern Lower California.

140. *Astragalus Gambelliànus* Sheldon. Gambell's Dwarf Locoweed. Fig. 2914.

Astragalus nigrescens Nutt. Journ. Acad. Phila. II. 1: 153. 1847. Not Pall.

Astragalus Gambellianus Sheldon, Minn. Bot. Studies 1: 21. 1894.

Hesperastragalus Gambellianus Heller, Muhlenbergia 2: 87. 1905.

Slender annual 4–20 cm. high, branching from the base. Leaves 1.5–3 cm. long; leaflets 9–13, linear to cuneate-oblong, retuse, 3–8 mm. long, strigose, often sparsely so; peduncles slender, 1–3 cm. long; flowers short-spicate or capitate; calyx black-hairy, about 2.5 mm. long, the lobes about equaling the tube; corolla but slightly exceeding the calyx, purple or tipped with purple; pods well-exserted and strongly reflexed, pubescent with spreading crisped white hairs, slightly curved and deltoid or ovoid, narrowly and deeply sulcate on the lower suture, the upper suture forming a keel, the sides concave between the suture and the margin of the pod.

Gravelly or sandy soils, Upper Sonoran Zone; Inner Coast Ranges and Sacramento Valley, to cismontane southern California and northern Lower California. Type locality: Santa Catalina Island. April–May.

Astragalus Gambellianus subsp. *Elmeri* (Greene) Abrams. (*Astragalus Elmeri* Greene, Erythra 3: 98. 1895.) Like typical *Astragalus Gambellianus* in all essential characters but the pubescence of the pod upwardly

appressed instead of spreading. This is the common form in the San Francisco Bay region and occurs as far south as Malibu, Los Angeles County.

Sphaerophysa salsula (Pall.) DC. Prod. 2: 271. 1825. Perennial from a woody rootstock, the stems erect, about 1 m. high, strigose. Leaves 5–7 cm. long; leaflets 9–19, elliptic to obovate, 5–10 mm. long, glabrate above; racemes axillary, pedunculate, 6–15 cm. long; calyx 3–4 mm. long; corolla 12–15 mm. long, red-orange, the standard with a 2-lobed yellow spot, the keel yellow below; pod bladderly-inflated, 1-celled, borne on a reflexed pedicel, but the stipe also reflexed bringing the pod to a horizontal position. An *Astragalus*-like plant apparently recently introduced at Umatilla, Oregon, also Utah and Colorado. Native of northern and central Asia.

19. OXYTROPIS DC. Astrag. 24. 1802.

Perennial herbs, from a stout woody taproot and usually with a much-branched crown. Leaves basal or nearly so, odd-pinnate. Flowers racemose or spicate, terminating the scape-like peduncles. Calyx campanulate with subequal teeth. Petals clawed; standard erect, ovate or oblong; wings oblong; keel produced into a porrect beak. Stamens 10, diadelphous. Pods sessile or stipitate, coriaceous, usually completely or incompletely 2-celled by the intrusion of the upper suture. [Name Greek, meaning sharp and keel.]

A genus of about 160 species inhabiting North America, especially the western part, and Eurasia. Type species, *Oxytropis montana* (L.) DC.

Pods erect or ascending; stipules decidedly adnate to the petiole.

Inflorescence 1–3-flowered; plants dwarf, pulvinate; corolla purple; pod inflated, ovoid. 1. *O. oreophila*.

Inflorescence many-flowered; plants not pulvinate; pod oblong, not inflated.

Plants silky-villous, not viscid.

Stipules glabrous on the back; leaflets 6–8 mm. long; corolla yellowish or nearly white, 10–12 mm. long. 2. *O. cusickii*.

Stipules more or less appressed-pilose on the back; longer leaflets 15–20 mm. long; corolla yellow, 15–17 mm. long. 3. *O. luteola*.

Plants thinly villous, viscid and beset with slightly raised glands. 4. *O. viscida*.

Pods pendent in fruit; stipules only slightly adnate at base to the petiole.

5. *O. deflexa*.

1. *Oxytropis oreophila* A. Gray. Rock-loving Oxytrope. Fig. 2915.

Oxytropis oreophila A. Gray, Proc. Amer. Acad. 20: 3. 1884.

Aragallus oreophilus A. Nels. Erythra 7: 59. 1899.

Spiesia oreophila Kuntze, Rev. Gen. Pl. 1: 207. 1891.

Perennial with a much branched caespitose woody caudex, densely silvery-silky pubescent throughout. Leaves crowded at the apex of the caudex branches, 1.5–3 cm. long; leaflets 5–11, lance-elliptic, 4–6 mm. long; scape slender, 2–7 cm. long; racemes short, 1–8-flowered; calyx silky-villous, the tube 5 mm. long, the teeth 1.5 mm. long; corolla violet-purple, 10–12 mm. long; pod inflated, ovoid, 10 mm. long, densely white-villous.

Rocky alpine ridges, Boreal Zones; Utah, Nevada, and the summits of Mount San Antonio and Mount San Geronio, southern California. Type locality: Aquarius Plateau at nearly 10,000 feet altitude, Utah. June–July.

Oxytropis columbiæna St. John, Proc. Biol. Soc. Wash. 41: 100. 1928. Perennial with a woody taproot and branched crown, acaulescent. Leaves many, canescent with appressed-pilose pubescence, becoming greater in age; stipules generally appressed-pilose; leaflets 17–21, elliptic or oblong-lanceolate, acute, 8–20 mm. long; scapes 15–20 cm. long; spike becoming 3–5 cm. long; calyx narrowly campanulate, 9–10 mm. long, the teeth subulate, 2–3 mm. long; corolla 15–16 mm. long, white with delicate blue veins; keel with a large violet blotch just below the apex; standard oblong, emarginate, bisulate and reflexed; pod oblong or lanceolate in outline, attenuate to a slender beak. Gravelly soils, Arid Transition Zone; along the Columbia River, Stevens County, Washington. Type locality: gravelly branches of the Columbia River, Marcus, Washington.

2. *Oxytropis cusickii* Greenm. Cusick's Oxytrope. Fig. 2916.

Oxytropis cusickii Greenm. Erythra 7: 116. 1899.

Oxytropis mazama St. John, Proc. Biol. Soc. Wash. 41: 101. 1928.

Oxytropis cascadenis St. John, op. cit. 105.

Perennial, depressed-caespitose. Leaves 4–8 cm. long, silvery with somewhat appressed villous pubescence; leaflets 7–19, oblong-lanceolate, 4–8 mm. long, acute or rarely obtuse, the margins more or less involute; stipules scarious, 3-nerved, glabrous or nearly so on the outer surface; scape in fruit nearly twice the length of the leaves; flowers yellowish, 10–12 mm. long; calyx 7–9 mm. long, villous-canescens, with shorter black hairs intermingled; teeth 2 mm. long; standard 10–12 mm. long, oblong-obovate, deeply emarginate; pod cylindric, 15–20 mm. long, appressed-pubescent with white and black hairs.

Alpine summits, Boreal Zones; Olympic and Cascade Mountains, Washington, and the Wallowa Mountains, Oregon. Type locality: alpine summits, Wallowa Mountains, Oregon. July–Aug.

3. *Oxytropis luteola* (Greene) Piper. Yellow-flowered Oxytrope. Fig. 2917.

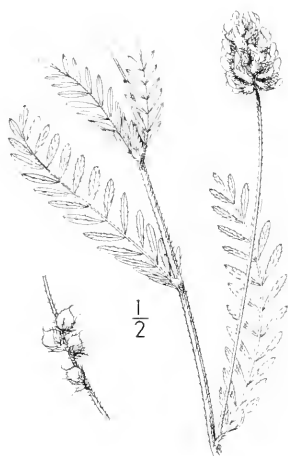
Aragallus luteolus Greene, Proc. Biol. Soc. Wash. 18: 17. 1905.

Oxytropis luteolus Piper in Piper & Beattie, Fl. Northw. Coast 227. 1915.

Oxytropis okanoganea St. John, Proc. Biol. Soc. Wash. 41: 102. 1928.

Oxytropis olympica St. John, Proc. Biol. Soc. Wash. 41: 103. 1928.

Perennial, the somewhat woody caudex branches forming few to several crowns. Leaves 6–10 cm. long, rather densely appressed-villous and canescent or almost silvery; leaflets 15–21, lance-elliptic to linear-lanceolate, acutish or sharply acute, 8–15 mm. long; scapes 10–18 cm. long; spikes 3–5 cm. long, 7–15-flowered, the flowers spreading or more or less ascending; bracts lanceolate, 5 mm. long; calyx-tube cylindric, 5–6 mm. long, villous with white and black hairs;



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2906. *Astragalus Spaldingii*
2907. *Astragalus Austiniae*
2908. *Astragalus Lyallii*

2909. *Astragalus lentiformis*
2910. *Astragalus Lemmonii*
2911. *Astragalus Breweri*

2912. *Astragalus dispermus*
2913. *Astragalus didymocarpus*
2914. *Astragalus Gambellianus*

teeth 2.5 mm. long; corolla yellowish, 15–17 mm. long; pods ascending, subterete, 12–15 mm. long, 5 mm. thick, pubescent with white and black hairs.

Rocky ridges, Boreal Zones; Olympic and Cascade Mountains, Washington, to northern Idaho and adjacent British Columbia. Type locality: Olympic Mountains, Washington. June–July.

4. *Oxytropis viscida* Nutt. Sticky or Viscid Oxytrope. Fig. 2918.

Oxytropis viscida Nutt. in Torr. & Gray, Fl. N. Amer. 1: 341. 1838.

Spiesia viscida Kuntze, Rev. Gen. 1: 207. 1891.

Aragallus viscidus Greene, Pittonia 3: 211. 1897.

Perennial with a branched woody caudex. Leaves 10–15 cm. long; leaflets 25–57, oblong-lanceolate to lanceolate-ovate, acute or obtuse; scape 5–15 cm. high, villous-hirsute; stipe 3–8 cm. long, flowers mostly ascending; calyx-tube villous, 5 mm. long, the teeth subulate, 2.5–3 mm. long; corolla violet, rarely white, 12 mm. long; pod oblong-ovoid, 12–15 mm. long, short-pubescent.

Moist meadows, Boreal Zones; Rocky Mountains and Great Basin species, reaching the Pacific States in eastern Oregon and in the White Mountains and eastern slopes of the Sierra Nevada, Inyo County, California. Type locality: "Rocky mountains, near the sources of the Oregon." June–July.

5. *Oxytropis deflexa* (Pall.) DC. Pendent Pod Oxytrope. Fig. 2919.

Astragalus deflexus Pall. Act. Acad. Petrop. 2: 268. pl. 15. 1779.

Oxytropis deflexa DC. Astrag. 96. 1802.

Aragallus deflexus Heller, Cat. N. Amer. Pl. 4: 1898.

Perennial, loosely villous, acaulescent or sometimes with one or two short stems from the crown. Leaflets 25–41, lanceolate to ovate, 5–20 mm. long, acute; raceme loosely flowered; calyx-teeth subulate, nearly as long as the tube; corolla 6–9 mm. long, whitish below, blue above; pod oblong, about 15 mm. long, strongly reflexed.

Moist ground, Boreal and Transition Zones; Alaska southward to Idaho, South Dakota, New Mexico, and eastern Washington, where it has been collected near Old Waucanda, and also near Tonasket, Okanogan County. Type locality: Siberia. May–July.

Oxytropis Párryi A. Gray, Proc. Amer. Acad. 20: 4. 1884. Tufted or matted on the root crown, 3–7 cm. high, densely silvery-pubescent. Leaflets 11–15, oblong to ovate-oblong, 3–4 mm. long; peduncles exceeding the leaves, 2–5 cm. long, 1–2-flowered; calyx black and white strigose; corolla purple, 8–10 mm. long; pods 1–2 cm. long, oblong, acute, grooved ventrally, canescent. A single collection from Sheep Mountain, White Mountains, Inyo County, California, is doubtfully referred to this species of Utah and New Mexico.

20. GLYCYRRHIZA [Tourn.] L. Sp. Pl. 741. 1753.

Perennial herbs, with thick sweet roots and odd-pinnate leaves. Flowers in axillary spikes or racemes, blue or white. Calyx-teeth subequal, the two upper sometimes partly united. Standard short-clawed, with a narrowly ovate or oblong blade; wings oblong; keel acute or obtuse. Stamens mainly diadelphous; anthers alternating longer and shorter. Pod sessile, covered with prickles or glands, indehiscent, several-seeded. [Name Greek, meaning sweet root.]

About 15 species, natives of the north temperate zone, southern South America and Australia. Type species, *Glycyrrhiza glabra* L.

1. *Glycyrrhiza lepidota* Pursh. Wild or American Licorice. Fig. 2920.

Liquiritia lepidota Nutt. in Fraser's Cat. 1813. Hyponym.

Glycyrrhiza lepidota Pursh, Fl. Amer. Sept. 480. 1814.

Stems erect, 3–10 dm. high, herbage beset with minute scales or glands, otherwise glabrous or more or less puberulent. Leaves short-petioled; stipules lanceolate, acute, 4–6 mm. long, deciduous; leaflets 11–19, lanceolate to oblong, acute or obtuse, mucronate, entire, 2–3 cm. long, short-petiolulate; peduncles shorter than the leaves; spikes 2.5–5 cm. long, many-flowered; calyx narrowly campanulate, the teeth lanceolate-acuminate, longer than the tube; corolla yellowish white, 8–12 mm. long; pod about 12 mm. long, oblong, beset with hooked prickles, suggesting a cockle-bur.

Low ground and waste places, Boreal to Lower Sonoran Zones; British Columbia and Saskatchewan to southern California, Minnesota, Missouri, and Chihuahua. Type locality: on the banks of the Missouri River, near St. Louis. May–Aug.

Glycyrrhiza lepidota var. *glutinosa* (Nutt.) S. Wats. in Brewer & Wats. Bot. Calif. 1: 144. 1876. Stems, petioles and peduncles glandular-villous, as well as scaly; spikes usually not over half the length of the leaves. This is the more common form on the Pacific slope, especially west of the Cascade Mountains in Washington and Oregon and in the Coast Ranges of California, but it extends eastward to Idaho. The type locality is on the Snake River.

21. CORONILLA [Tourn.] L. Sp. Pl. 742. 1753.

Herbs, with odd-pinnate leaves. Flowers in axillary pedunculate heads or umbels, purple or yellow. Calyx-teeth subequal, the two upper somewhat united. Petals clawed; standard suborbicular; wings oblong to obliquely obovate; keel beaked, incurved. Stamens diadelphous; anthers uniform. Pod terete, angled or compressed, jointed. [Name Greek, diminutive of crown.]

An Old World genus of about 25 species. Type species, *Coronilla varia* L.

1. *Coronilla varia* L. *Coronilla*, Axseed. Fig. 2921.

Coronilla varia L. Sp. Pl. 743. 1753.

Perennial, the stems branching, straggling or ascending, glabrous, 3–6 dm. high. Leaves sessile; leaflets 11–25, oblong to obovate, 1–2 cm. long, obtuse and mucronate; peduncles longer than the leaves; flowers capitate, 8–12 mm. long, on slender pedicels; standard pink, wings white, keel purple-tipped; pod linear, 4-angled, the joints 6–8 mm. long.

Native of Europe, sparingly naturalized in western Oregon, especially on ballast near Portland. June–July.

22. *HEDYSARUM* L. Sp. Pl. 745. 1753.

Perennial herbs or some species shrubs, with odd-pinnate leaves, and persistent stipules. Flowers showy in axillary pedunculate racemes. Calyx bracteolate, its teeth subequal. Standard short-clawed, obovate to orbicular; wings oblong; keel obtuse, exceeding the other petals. Stamens diadelphous. Pod compressed, jointed, its joints orbicular or quadrate, approximate, readily separable. [Name Greek, meaning sweet-broom.]

A genus of about 70 species, natives of the north temperate zone. *Type species*, *Hedysarum coronarium* L.

Flowers purple.

Pods of 4–7 joints, strigose; calyx-lobes longer than the tube, subulate.

Pods of 1–3 joints, glabrous; calyx-lobes shorter than the tube.

Flowers yellow.

1. *H. Mackenzii*.

2. *H. occidentale*.

3. *H. sulphurescens*.

1. *Hedysarum Mackenzii* Richards. Mackenzie's *Hedysarum* or Sweet-broom. Fig. 2922.

Hedysarum Mackenzii Richards. in Frankl. 1st Journ. Bot. App. 745. 1823.

Stems 2–5 dm. high, strigose-pubescent or glabrate toward the base. Leaves 10–15 cm. long; leaflets 7–15, oblong-elliptic, 10–25 mm. long, glabrous above, cinereous-strigulose beneath; calyx rather sparsely strigose-pubescent, the tube 3 mm. long; teeth subulate, 4–5 mm. long; corolla purple, 18–20 mm. long; pods rather densely strigulose, 4–7-jointed, the joints 6–8 mm. long, 4–6 mm. wide.

Dry slopes usually among shrubs, Canadian Zone; Yukon to Alberta. In the Pacific States known only from the Wallowa Mountains, Oregon. Type locality: barren grounds from Point Lake to the Arctic Sea. July–Aug.

2. *Hedysarum occidentale* Greene. Western *Hedysarum* or Sweet-broom. Fig. 2923.

Hedysarum occidentale Greene, Pittonia 3: 19. 1896.

Stems usually several from the woody crown, erect, 3–6 dm. high, striate, glabrous or very sparingly pubescent. Leaves subsessile, 7–15 cm. long; stipules brownish and scarious, the lowest 15–20 cm. long, sheathing, the upper smaller and lanceolate; leaflets 13–21, elliptic to ovate-elliptic, 10–25 mm. long, mucronate, pilose on the midvein and along the margins on the lower surface; racemes well exceeding the leaves, many-flowered; corolla reddish purple, 15–20 mm. long; keel exceeding the other petals; pods of 1–3 joints, these elliptic-obovate, 6–9 mm. wide, reticulate-veined, sparsely strigose.

Dry slopes, near timber line, Boreal Zones; Olympic Mountains, Washington. Type locality: Olympic Mountains, Washington. June–Aug.

3. *Hedysarum sulphurescens* Rydb. Yellow *Hedysarum* or Sweet-broom. Fig. 2924.

Hedysarum flavescens Coult. & Fisher, Bot. Gaz. 18: 300. 1893. Not Regel & Schmalb. 1882.

Hedysarum sulphurescens Rydb. Bull. Torrey Club 24: 251. 1897.

Stems several from the perennial root, erect or ascending, 3–5 dm. high, appressed-pubescent or nearly glabrous. Leaflets 11–15, oblong to oval, 1–4 cm. long, glabrous or nearly so, shining; racemes much exceeding the leaves, loosely flowered; calyx strigose, the teeth lanceolate, 1–2 mm. long; corolla about 15 mm. long, sulphur-yellow; pods 2–3-jointed, the joints elliptic-obovate, 6–7 mm. broad, reticulate-veined, glabrous.

Open wooded slopes, Boreal Zones; eastern Washington (Okanogan County) and British Columbia to Alberta, Montana, and Wyoming. Type locality: Helena, Montana. June–Aug.

23. *ALHAGI* [Tourn.] Adans. Fam. Pl. 2: 328. 1763.

Rigid branched shrubs with axillary spines. Leaves simple, small, entire; stipules small. Flowers in axillary racemes, red; the rachis rigid and spine-tipped; bracts minute. Calyx turbinate, the teeth short, subequal. Standard obovate, short-clawed; wings oblong-falcate; keel obtuse, incurved. Stamens diadelphous; anthers uniform. Ovary subsessile, few- to many-ovuled; style filiform; stigma minute, terminal. Pod linear, compressed or subterete, indehiscent, constricted between the seeds. Seeds reniform. [The Mauretanian name.]

Three species, natives of the eastern Mediterranean region and central and eastern Asia. Type species, *Alhagi maurorum* Medic.

1. *Alhagi camelòrum* Fisch. Camel Thorn. Fig. 2925.

Alhagi camelorum Fisch. Hort. Gorenk. ed. 2. 72. 1812.

Low shrub, 4-8 dm. high, the branches striate, pale green and glabrous, the spines slender, 10-25 mm. long. Leaves linear to elliptic-oblong, 8-15 mm. long, tipped with a recurved apiculation, glabrous above, strigose beneath, at least when young, and on the short petiole; raceme rachis 2-3 cm. long, bearing mostly 4-6 flowers; pedicels slender, 2-3 mm. long; calyx 2 mm. long, the teeth broadly triangular, very short; corolla reddish purple, about 8-9 mm. long; pod distinctly stipitate, torulose, strongly constricted between the few seeds.

Naturalized from Asia Minor; locally established in Fresno, Imperial, and San Diego Counties, California. June-July.

24. *VÍCIA* [Tourn.] L. Sp. Pl. 734. 1753.

Herbaceous vines, with pinnate tendril-bearing leaves and conspicuous stipules. Flowers axillary, solitary or racemose, purple or yellowish. Calyx with a somewhat oblique tube and subequal or unequal teeth. Petals clawed; standard obovate to oblong, emarginate; wings oblique-oblong, adherent to the shorter oblong keel. Stamens diadelphous; anthers uniform. Ovary sessile or stipitate; ovules many; style slender with a tuft or ring of hairs at the apex. Pod strongly compressed, dehiscent, 2-valved; seeds subglobose. [Classical Latin name of the Vetch.]

About 130 species of wide geographic distribution. Type species, *Vicia sativa* L.

Flowers sessile or on very short peduncles, 1 or 2 in the leaf axils; annuals.

Flowers 20-30 mm. long; seeds black, globose.

Flowers 10-15 mm. long; seeds brown, somewhat compressed.

Flowers on more or less elongated peduncles.

Corolla 4-7 mm. long; slender annuals.

Pod hirsute, 2-seeded; peduncles 2-6-flowered.

Pod glabrous, several-seeded; peduncles 1- or rarely 2-flowered.

Pod 8-12 mm. long, 3-4 mm. wide, rounded at both ends.

Pod 25-30 mm. long, 5 mm. wide, obliquely pointed at both ends.

Corolla 10-20 mm. long; perennials except *V. villosa*.

Racemes short, 3-8-flowered.

Stems glabrous or nearly so; leaflets strigose or sometimes glabrate above; pods glabrous.

Stems and leaflets villous-tomentose; pods pubescent.

Racemes elongated, one-sided, many-flowered.

Flowers violet; pod not turning black.

Annual or biennial, densely villous with spreading hairs; flowers violet.

Perennials, glabrous or appressed-pubescent.

Flowers reddish purple to tawny; plants glabrous; pod and usually whole plant turning black in drying.

1. *V. sativa*.

2. *V. angustifolia*.

3. *V. hirsuta*.

4. *V. tetrasperma*.

5. *V. exigua*.

6. *V. americana oregana*.

7. *V. californica*.

8. *V. villosa*.

9. *V. Cracca*.

10. *V. gigantea*.

1. *Vicia sativa* L. Common or Spring Vetch. Tare. Fig. 2926.

Vicia sativa L. Sp. Pl. 736. 1753.

Annual, the stems glabrous or sparingly pubescent, mostly ascending, 3-8 dm. high. Leaves 6-10 cm. long; leaflets 8-14, obovate or oblong to oblong-oblancoate, 12-30 mm. long, truncate or emarginate, mucronate, pilose-pubescent when young, becoming more or less glabrate in age; flowers 1 or 2 in the axils, sessile or subsessile, violet-purple, 20-25 mm. long; calyx-teeth equaling the tube; pod linear-oblong, 4-7 cm. long, brown; seeds slightly compressed.

Roadsides and fields; naturalized on the Pacific Coast from Vancouver Island to southern California. Native of Europe. April-Aug.

Vicia Faba L. Sp. Pl. 737. 1753. Horse Bean. Erect annual, 4-8 dm. high, glabrous or nearly so. Leaflets oval to elliptic, 4-6 cm. long, obtuse, mucronate; tendrils rudimentary or wanting; flowers in the axils, subsessile, dull white with a large dark purple spot on the wings; pods 5-20 cm. long; seeds large, flat. Native of the Old World, and cultivated since prehistoric times. Becoming naturalized in coastal central and southern California.

2. *Vicia angustifolia* L. Smaller Common Vetch. Fig. 2927.

Vicia angustifolia L. Moen. Acad. 4: 105. 1759.

Vicia sativa var. *angustifolia* Ser. in DC. Prod. 2: 361. 1825.

Annual or winter annual, glabrous or sparsely puberulent, the stems slender, 3-6 dm. long. Leaves 5-8 cm. long; leaflets 6-12, narrowly linear to oblong-oblancoate, acutish to truncate or emarginate, prominently mucronate, 15-25 mm. long, glabrate or sparsely appressed-puberulent; flowers 1 or 2 in the axils, sessile; calyx-teeth about as long as the tube; corolla violet, 12-18 mm. long; pod linear-oblong, 4-6 cm. long, black; seeds globose.

Roadsides and fields, naturalized in the Pacific States from Washington to California. Native of Europe. April-July.

3. *Vicia hirsuta* (L.) Koch. Hairy Vetch or Tare. Fig. 2928.

Ervum hirsutum L. Sp. Pl. 738. 1753.

Vicia Mitchellii Raf. Préc. Découv. 37. 1814.

Vicia hirsuta Koch, Syn. Fl. Germ. 191. 1837.

Annual, the stems slender, 15-60 cm. long, glabrous or nearly so. Leaves 3-5 cm. long;

stipules narrowly linear, usually auriculate and sometimes toothed; leaflets 12–14, narrowly linear to linear-oblong, truncate, often notched, mucronate, sparsely pubescent or glabrous; peduncles slender, about half the length of the leaves, 2–6-flowered; corolla nearly white with a tinge of pale blue-purple, 3 mm. long; pod oblong, 6–9 mm. long, hirsute-pubescent, 2-seeded.

Roadsides, western Washington and Oregon, naturalized from Europe. June–July. Tine Tare.

4. *Vicia tetrasperma* (L.) Moench. Slender Vetch or Tare. Fig. 2929.

Ervum tetraspermum L. Sp. Pl. 738. 1753.

Vicia tetrasperma Moench, Meth. 148. 1794.

Annual, nearly or quite glabrous, stems slender, weak, 1.5–5 dm. long. Leaves short-petioled; stipules linear; leaflets 6–12, linear to linear-oblong, 12–18 mm. long, obtuse or acutish, thin; peduncles filiform, equaling or shorter than the leaves, 1–6-flowered; flowers light purple, 4–6 mm. long; pod 8–12 mm. long, glabrous, 3–6-seeded.

Meadows and roadsides, Humid Transition Zone; Portland and Willamette Valley, Oregon, to Humboldt County, California; naturalized from Europe. May–July.

5. *Vicia exigua* Nutt. Slender Vetch. Fig. 2930.

Vicia exigua Nutt. in Torr. & Gray, Fl. N. Amer. 1: 272. 1838.

Annual, the stems slender, erect or ascending, usually branching below the base, 3–7 dm. high, glabrous. Leaves rather distant, with slender rachis, well prolonged beyond the leaflets; stipules semisagittate, entire; leaflets 2–4 pairs, linear to narrowly linear, 1–2.5 cm. long, usually rounded at apex but varying from obtuse to rarely emarginate, minutely and very sparsely strigose be-



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2915. *Oxytropis oreophila*

2916. *Oxytropis cusickii*

2917. *Oxytropis luteola*

2918. *Oxytropis viscida*

2919. *Oxytropis deflexa*

2920. *Glycyrrhiza lepidota*

neath or glabrous; peduncle very slender, 2.5–4 cm. long, 1-flowered or rarely 2-flowered; corolla about 5 mm. long, white or purplish; pod 2.5–3 cm. long, glabrous, several-seeded.

Open woods, Upper Sonoran and Transition Zones; southern Oregon southward through the Coast Ranges to northern Lower California. Type locality: "Upper California." Probably Monterey or Santa Barbara. April–June.

Vicia exigua var. *Hássei* (S. Wats.) Jepson, Fl. W. Mid. Calif. 296. 1901. (*Vicia Hassei* S. Wats. Proc. Amer. Acad. 25: 129. 1890.) Plants stouter, leaflets linear-oblong, deeply notched at apex; flower 6–7 mm. long. Probably only a leaf-form of the species, about the same range as the species but less frequent. Another leaf-form, more plentiful in southern California and northern Lower California, has very narrowly linear, acute leaflets.

6. *Vicia americana* subsp. *oregana* (Nutt.) Abrams. American Vetch. Fig. 2931.

Vicia oregana Nutt. in Torr. & Gray, Fl. N. Amer. 1: 270. 1838.

Vicia americana var. *oregana* A. Nels. in Coult. & Nels. Man. Bot. Rocky Mts. 301. 1909.

Perennial, trailing or climbing, 6–10 dm. long, sparsely pubescent. Stipules semisagittate, incisely toothed; leaflets 8–16, oblong-elliptic to ovate-elliptic, rounded to somewhat emarginate at apex, cuspidate and often with a few low serrations, 15–45 mm. long, thin and sparsely strigose beneath, glabrate above; peduncles shorter than the leaves; raceme short, 2–7-flowered; calyx-teeth lanceolate; corolla purple; standard 15–18 mm. long; pod glabrous, 3–4 cm. long.

Grassy slopes in open woods, Transition and Upper Sonoran Zones; British Columbia to southern California, east to Idaho. Type locality: "Plains of the Oregon [Columbia River]." April–June. In the Rocky Mountain region this subspecies intergrades with the eastern *Vicia americana* Muhl. which is glabrous.

Vicia americana var. *truncata* (Nutt.) Brewer in Brewer & Wats. Bot. Calif. 1: 158. 1876. Leaves oblong to linear-oblong, at least the upper truncate at the apex, the lower often narrower and acute. About the same range as the preceding subspecies, and best considered as a leaf-form of it.

Vicia americana var. *linearis* S. Wats. Proc. Amer. Acad. 11: 134. 1875. (*Vicia linearis* Greene, Fl. Fran. 3. 1891.) Leaves all narrowly linear and acute or some of the uppermost truncate or emarginate. About the same range as the two preceding in the Pacific States, and probably only a leaf-form; a pale, more pubescent and stronger-veined form occurring east of the Cascade–Sierra Nevada Divide and extending eastward through the Great Basin region is *Vicia sparsifolia* Nutt.

7. *Vicia californica* Greene. California Vetch. Fig. 2932.

Vicia californica Greene, Fl. Fran. 3. 1891.

Vicia pumila Heller, Muhlenbergia 2: 88. 1905.

Vicia Durbrowii Eastw. Bull. Torrey Club 32: 196. 1905.

Perennial, the stems branching from the base, mostly spreading, rather stiff and zigzag, 2–3 dm. long, rarely climbing and taller, finely villous-pubescent. Leaflets 8–12, elliptic to cuneate-obovate, 6–15 mm. long, truncate or blunt, and finely pectinate-denticulate at apex, or rarely simply mucronate, firm, strongly veined and canescent with a rather dense villous tomentum; stipules semisagittate, lacinate-toothed; racemes 4–8-flowered; corolla deep purple, about 12–15 mm. long; pods 2.5 cm. long, about 8 mm. wide, pubescent.

Dry soils in open coniferous forests, Arid Transition Zone; southern Oregon to southern California. Type locality: Calaveras County, California. April–June. Sierra Vetch.

Vicia californica var. *madrénsis* Jepson, Fl. Calif. 2: 386. 1936. "Leaflets strongly serrate above the base." North Fork, Madera County, California.

8. *Vicia villòsa* Roth. Winter or Woolly Vetch. Fig. 2933.

Vicia villosa Roth, Tent. Fl. Germ. 2: 182. 1789.

Annual or biennial, in general habit resembling the preceding species, but villous throughout with spreading, somewhat tangled hairs. Leaflets linear to oblong-linear, obtuse or acute, mucronate; racemes one-sided, many-flowered, corolla violet-purple, 15 mm. long; pod broadly oblong, oblique at each end, 4–6-seeded, glabrous.

Roadsides and fields, naturalized from Europe; Washington to central California. April–July. Crimson Vetch.

9. *Vicia Cracca* L. Cow Vetch, Blue Vetch. Fig. 2934.

Vicia Cracca L. Sp. Pl. 735. 1753.

Vicia semicincta Greene, Erythraea 3: 17. 1895.

Perennial, finely pubescent or glabrate, the stems slender, climbing or trailing, 5–10 dm. long. Leaves 4–7 cm. long; stipules narrowly semisagittate, entire; leaflets 8–24, linear to linear-oblong, acute or obtuse, mucronate, 15–20 mm. long; racemes elongated, one-sided, densely flowered; corolla violet, 9–12 mm. long; pod glabrous, 18–24 mm. long.

Sparingly naturalized in the Pacific States from Washington to northern California, also in the Rocky Mountain and eastern states. Native of Eurasia. June–Aug. Bird Vetch.

10. *Vicia gigantea* Hook. Giant Vetch. Fig. 2935.

Vicia gigantea Hook. Fl. Bor. Amer. 1: 157. 1839.

Perennial, the stems stout, somewhat fistulous, sparingly pubescent, ascending or climbing, 6–10 dm. high, the whole plant turning dark when drying. Leaves 10–12 cm. long, leaflets approximate, 9–13 pairs, narrowly-oblong to oblong-lanceolate, rounded or obtuse at apex, 15–35

mm. long, sparsely strigose on both surfaces; peduncles shorter than the leaves; raceme densely flowered, one-sided; flowers reddish purple, about 12 mm. long; pod oblong, 3-4 cm. long, several-seeded; seeds globose, black.

Borders of swamps and streams near the coast, Humid Transition and Canadian Zones; southern Alaska to Monterey County, California, extending inland to the Willamette Valley, Oregon. Type locality: open woods on the Columbia River. March-July.

Vicia dispérma DC. Cat. Hort. Monsp. 154. 1813. Annual, somewhat pilose with 8-10 pairs of linear-oblong mucronate leaflets; peduncles 2-3-flowered, shorter than the leaves; flowers minute; calyx-lobes lanceolate-subulate, about equaling the corolla; pod oblong, 2-seeded. Native of southern Europe, locally introduced at Berkeley, California.

Vicia pannónica Crantz, Stirp. Aust. ed. 2. 393. 1769. Hungarian Vetch. Annual, with reclining or climbing stems, 2-6 dm. long. Leaves with very short petioles; stipules small; leaflets 8-16, linear to oblong, long-villous especially when young; peduncles very short, 2-4-flowered; flowers yellowish white, 15-18 mm. long. Introduced from Europe and becoming established in several places in Willamette Valley, Oregon, and Sonoma County, California.

25. LÁTHYRUS L. Sp. Pl. 729. 1753.

Annual or mostly perennial, herbaceous vines or rarely erect herbs. Leaves pinnate, the rachis usually produced into a tendril. Flowers in axillary racemes or sometimes solitary. Calyx obliquely campanulate or gibbous at the base, its teeth nearly equal, or the upper shorter. Corolla nearly as in *Vicia* but commonly larger, and proportionately shorter for its breadth. Stamens diadelphous or monadelphous below. Style curved, flattened, hairy along the inner side. Pod flat or sometimes terete, 2-valved. [Ancient Greek name of some leguminous plant.]

About 100 species, natives of the northern hemisphere and South America. Type species, *Lathyrus sylvestris* L.

Leaflets none; the stipules large, simulating a pair of large opposite cordate leaves.

1. *L. Aphaca*.

Leaflets present.

Leaflets a single pair.

Annual; flowers 1 or 2 on the peduncle, 8-10 mm. long.

2. *L. pusillus*.

Perennial; stems strongly winged; flowers several on the peduncle, 2 mm. long.

3. *L. latifolius*.

Leaflets more than 1 pair.

Tendrils reduced and bristle-like, sometimes wanting, or sometimes once forked in *Nuttallii*.

Plants densely silky-villous.

4. *L. littoralis*.

Plants not densely silky-villous.

Flower solitary (rarely 2) on a short slender pedicel-like peduncle.

5. *L. Torreyi*.

Flowers in 2- to several-flowered racemes.

Leaflets linear-lanceolate, longer than the leaf-rachis.

Flowers 15-20 mm. long, white.

6. *L. Cusickii*.

Flowers 10 mm. long, purple.

7. *L. bijugatus*.

Leaflets oblong-lanceolate to obovate, shorter than the rachis.

Flowers purple.

Leaflets oblong-lanceolate, coriaceous, glabrous; tendrils rudimentary.

8. *L. rigidus*.

Leaflets ovate, thin, thinly pubescent; tendrils simple or sometimes forked.

10. *L. Nuttallii*.

Flowers white or yellowish.

9. *L. nevadensis*.

Tendrils well developed and usually forked.

Stems prominently winged on two of the angles.

Stems slender; leaflets 2-3 pairs; peduncles 2-6-flowered.

12. *L. palustris*.

Stems stout; leaflets 4-6 pairs; peduncles 6-15-flowered.

Plants puberulent.

13. *L. Watsonii*.

Plants glabrous.

14. *L. Jepsonii*.

Stems merely angled, or the angles rarely narrowly margined.

Plants glabrous.

Flowers cream-yellow, fading brownish yellow, 10-12 mm. long.

15. *L. sulphureus*.

Flowers more or less violet-purple.

Stipules large, over half the size of the adjacent leaflets.

Stipules as large as the leaflets.

16. *L. maritimus*.

Stipules about half as large as the leaflets.

17. *L. polyphyllus*.

Stipules narrow, thin, half the size of the adjacent leaflets.

Flowers 20-25 mm. long.

18. *L. pauciflorus*.

Flowers 12-15 mm. long.

19. *L. Schaffneri*.

Plants more or less pubescent.

Corolla 10-12 mm. long; leaflets linear or linear-lanceolate.

11. *L. Lanzswertii*.

Corolla 15 mm. or more in length.

Corolla 15-18 mm. long; lower calyx-lobes usually well exceeding the tube, lanceolate. Leaves and calyx more or less densely tomentose-pubescent; racemes shorter than the leaves.

20. *L. vestitus*.

Leaves and calyx glabrous or essentially so; racemes often longer than the leaves, many-flowered.

21. *L. Bolanderi*.

Corolla 20-35 mm. long; lower calyx-lobes narrowly subulate, shorter than or about equaling the tube.

Standard not strongly reflexed.

Flowers cream or flesh-colored, 20 mm. long.

22. *L. lactiflorus*.

Flowers rose-colored, 20-25 mm. long.

23. *L. Alefeldii*.

Standard strongly reflexed and lying back on the base of the flower; petals all deep red.

24. *L. splendens*.

1. *Lathyrus Aphaca* L. Yellow Vetchling. Fig. 2936.*Lathyrus Aphaca* L. Sp. Pl. 729. 1753.

Annual, with slender twining stems, 2-8 dm. high, glabrous throughout. Stipules large, simulating simple opposite leaves, broadly sagittate-cordate, 1-3 cm. long; leaflets none; tendrils simple, usually exceeding the stipules; peduncles slender, about as long as the tendrils, 1-flowered or rarely 2-flowered; flowers 6-9 mm. long, yellow; pods flat, 20-25 mm. long, 4-7-seeded.

Roadsides and waste places; naturalized from Europe and becoming established about the principal cities in the Willamette Valley, Oregon, also in Napa County, California. April-June.

2. *Lathyrus pusillus* Ell. Low Vetchling. Fig. 2937.*Lathyrus pusillus* Ell. Bot. S.C. & Ga. 2: 223. 1823.

Annual, glabrous, stems slender, narrowly winged, 3-6 dm. high. Leaflets 2, linear or narrowly oblong, 1-5 cm. long; tendrils simple or branched; peduncles mostly shorter than the leaves, usually 1-2-flowered; flowers 8-10 mm. long, purple; pod linear, 2-4 cm. long, glabrous.

Native of the eastern and southeastern United States; locally established in the Willamette Valley, Oregon. April-May.

3. *Lathyrus latifolius* L. Everlasting Pea. Fig. 2938.*Lathyrus latifolius* L. Sp. Pl. 733. 1753.

Perennial, glabrous; stems stout, winged, climbing, 1-2 m. high. Stipules lanceolate, often 2.5 cm. long; petioles winged, 2-3 cm. long; leaflets 2, ovate-lanceolate to lanceolate, 4-7 cm. long; peduncles longer than the leaves, many-flowered; flowers purple or white, 20-25 mm. long.

Occasionally appearing as an escape from gardens in western Oregon and northern California. Native of Europe. May-July.

Lathyrus hirsutus L. Sp. Pl. 732. 1753. Rough Pea. Annual, the nascent parts somewhat hairy; stems branching from the base, 6 dm. or more high, strongly winged on the angles. Stipules narrowly linear-lanceolate, 10-15 mm. long; leaflets 2, linear-lanceolate, 4-7 cm. long; tendrils well-developed, branched; peduncles longer than the leaves, 1-2-flowered; corolla red, about 7 mm. long; pod flat, villous-hirsute. Locally established in the Willamette Valley, Oregon. Native of Europe.

Lathyrus tingitānus L. loc. cit. Tangier Pea. Glabrous annual, with stout winged stems, 1-1.5 m. high. Leaflets 2, linear to narrowly lanceolate, 3-6 cm. long, strongly veined; peduncles commonly 2-flowered; flowers about 25 mm. long, deep red-purple. Escaped from gardens and becoming locally established in the Willamette Valley, Oregon. Native of the western Mediterranean region.

Lathyrus odoratus L. loc. cit. Sweet Pea. Stems rough-hairy, winged. Leaflets 2, oval or oblong; peduncles much longer than the leaves, 2-4-flowered; flowers showy, variable in color, very fragrant. Escaped from gardens and locally established in California. Native of Italy.

4. *Lathyrus littoralis* (Nutt.) Endl. Silky Beach Pea. Fig. 2939.*Astrophia littoralis* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 278. 1838.*Lathyrus littoralis* Endl. ex Walp. Rep. 1: 722. 1842.*Orobis littoralis* A. Gray, Pacif. R. Rep. 4: 58. 1856.

Perennial, densely silky-villous throughout, stems several, stout, decumbent, 2-6 dm. long. Leaflets 2-10, oblanceolate, 5-20 mm. long; stipules ovate, much larger than the leaflets; tendrils rudimentary or none; peduncles 4-9 cm. long, surpassing the leaves; flowers 4-10, purple or white, about 2 cm. long; calyx-teeth lanceolate; pods 3 cm. long, 1 cm. broad, densely villous.

Sand dunes and beaches along the coast, Canadian and Transition Zones; Washington to central California. Type locality: sand hills of the estuary of the Oregon. April-June.

5. *Lathyrus Tórrayi* A. Gray. Torrey's or Redwood Pea. Fig. 2940.*Lathyrus Torreyi* A. Gray, Proc. Amer. Acad. 7: 337. 1867.*Lathyrus Torreyi* var. *tenellus* Wiegand, Bull. Torrey Club 26: 135. 1899.

Perennial, minutely villous, the stems slender, branching from slender creeping rootstocks, erect, 1-4 dm. high. Leaflets 8-14, ovate to oblong-lanceolate, acute or obtuse, mucronate, 8-15 mm. long, rather thin, paler beneath; stipules small, semisagittate, lanceolate-subulate, entire; tendrils reduced to a short bristle-like prolongation; peduncles very slender, 8-40 mm. long, 1-2-flowered; calyx-teeth very unequal, the lower three subulate and longer than the tube; corolla 15 mm. long, the standard bluish purple, the other petals nearly white; pods 15-20 mm. long, pubescent.

Open woods, mainly Transition Zones; western Washington to the Coast Ranges of central California. Type locality: Mendocino or southern part of Humboldt County, California. April-July.

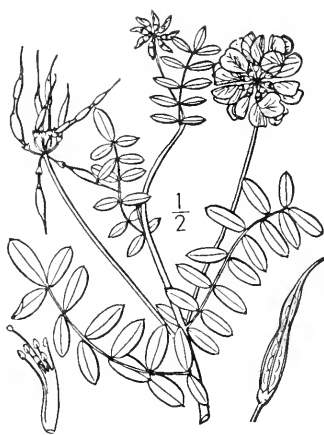
6. *Lathyrus Cusickii* S. Wats. Cusick's Pea. Fig. 2941.*Lathyrus Cusickii* S. Wats. Proc. Amer. Acad. 17: 371. 1882.

Perennial, glabrous or sparsely pubescent, the stems slender, erect or ascending, 2-4 dm. high. Leaflets 4-6, linear-lanceolate to narrowly linear, 3-6 cm. long; stipules semisagittate, narrowly lanceolate, 10-15 mm. long; tendrils none; peduncles slender, about as long as the leaves, 2-3-flowered; flowers about 2 cm. long, white; pods 4-5 cm. long.

Open coniferous forests and dry mountain slopes, Canadian Zone; Blue Mountains, Oregon. Type locality: "On dry mountain slopes, Union County, Oregon." May-June.

7. *Lathyrus bijugatus* White. Latah Pea. Fig. 2942.*Lathyrus bijugatus* White, Bull. Torrey Club 21: 457. 1894.

Perennial, glabrous, the stems erect, slender, branching from the base, 1-3 dm. high. Leaflets usually 2-4, oblong to elliptic, acute, 2-4 cm. long; tendrils reduced to a minute bristle; stipules



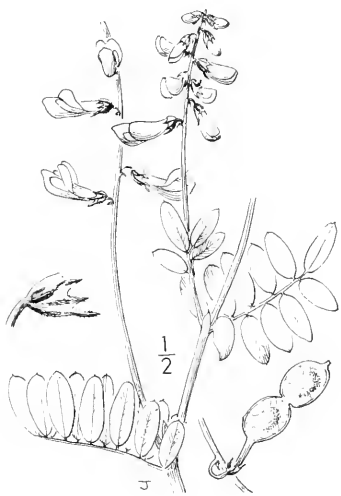
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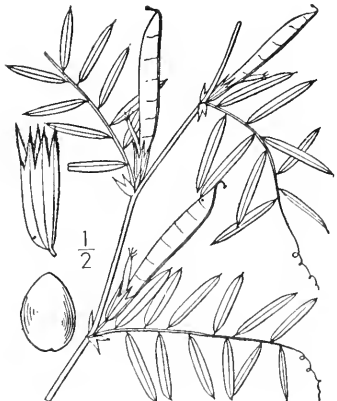
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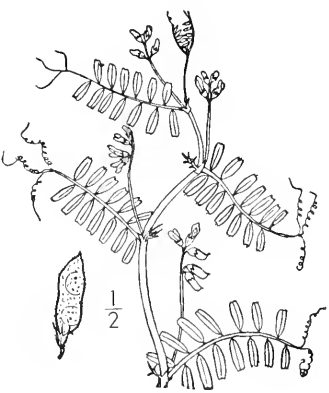
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2921. *Coronilla varia*
2922. *Hedysarum Mackenzii*
2923. *Hedysarum occidentale*

2924. *Hedysarum sulphurescens*
2925. *Alhagi camelorum*
2926. *Vicia sativa*

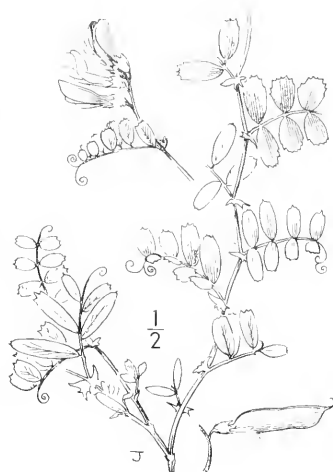
2927. *Vicia angustifolia*
2928. *Vicia hirsuta*
2929. *Vicia tetrasperma*



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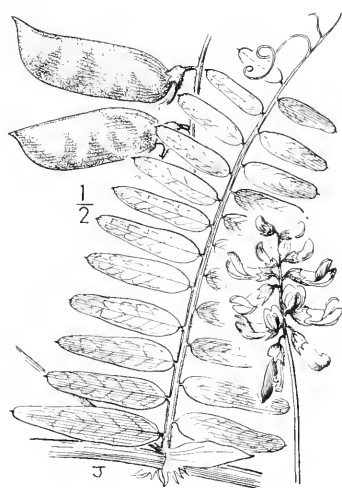
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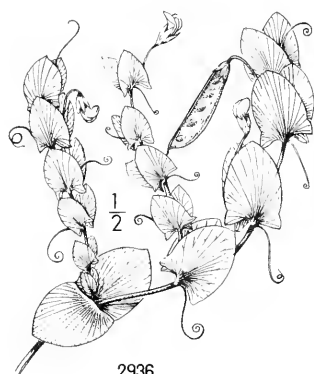
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2930. *Vicia exigua*
2931. *Vicia americana*
2932. *Vicia californica*

2933. *Vicia villosa*
2934. *Vicia Cracca*
2935. *Vicia gigantea*

2936. *Lathyrus Aphaca*
2937. *Lathyrus pusillus*
2938. *Lathyrus latifolius*

small, semisagittate, lanceolate-subulate; peduncles slender, about half as long as the leaves, 2-3-flowered; flowers purple, 10 mm. long; calyx-teeth deltoid, scarcely 2 mm. long; pods 3-4 cm. long.

Stony hillsides, Arid Transition Zone; Whitman County, Washington, and adjacent Idaho. Type locality: Latah County, Idaho. May-July.

Lathyrus bijugatus var. *Sandbergii* White, loc. cit. This is merely a form of the species with linear or linear-lanceolate leaflets. It grows in similar situations and has about the same range.

8. *Lathyrus rigidus* White. Rigid Pea. Fig. 2943.

Lathyrus albus S. Wats. Bot. Calif. 2: 442. 1880. Not Kittel.

Lathyrus rigidus White, Bull. Torrey Club 21: 455. 1894.

Perennial, glabrous and somewhat glaucous, the stems stout, several to many from a woody rootstock, erect or the base decumbent, 1.5-3 dm. high. Leaflets 6-10, oblong-lanceolate to oblanceolate, cuspidate, 1-2 cm. long, rigid and strongly veined; tendrils none or rudimentary; stipules semisagittate, as large as the leaflets; peduncles usually a little longer than the leaves, 1-3-flowered; flowers white, 15-20 mm. long; calyx-teeth narrowly-lanceolate to deltoid, shorter than the tube; pod glabrous, 30-35 mm. long; seeds usually 3.

Dry hillsides, Arid Transition Zone; Blue Mountains, eastern Oregon, south to Modoc County, California. Type locality: Union County, Oregon. April-June.

9. *Lathyrus nevadensis* S. Wats. Sierra Nevada Pea. Fig. 2944.

Lathyrus venosus var. *obovatus* Torr. Pacif. R. Rep. 4: 77. 1857.

Lathyrus nevadensis S. Wats. Proc. Amer. Acad. 11: 133. 1876.

Vicia nana Kell. Proc. Calif. Acad. 7: 89. 1876.

Lathyrus obovatus White, Bull. Torrey Club 21: 455. 1894.

Perennial, glabrous or sparingly pubescent, the stems erect, slender or rather stout, often branched, 1-5 dm. high. Leaflets 4-8, ovate to ovate-oblong, or especially those of the lower leaves often obovate, 1-3 cm. long, rather thin; stipules small, semisagittate, lanceolate-subulate; tendril a short bristle; peduncles usually a little exceeding the leaves, 2-4-flowered; calyx glabrous or sparingly pubescent, the longer lower teeth shorter than the tube; corolla about 20 mm. long, bluish purple, or the wings and keel somewhat ochroleucous; pods glabrous.

Open coniferous forests, Arid Transition Zone; Wallowa and Blue Mountains, Oregon, south to the central Sierra Nevada, California. Type locality: Sierra Nevada, Calaveras County, California. March-June.

Lathyrus nevadensis subsp. *stipulaceus* (White) Bradshaw, Bot. Gaz. 80: 244. 1925. (*L. obovatus* var. *stipulaceus* White, Bull. Torrey Club 21: 455. 1894.) Stipules larger, broadly lanceolate, the lower segment often toothed, tendrils often 15-20 mm. long; peduncles usually with more flowers. Eastern Washington and adjacent Idaho. Type locality: between Colville and Spokane, Washington.

10. *Lathyrus Nuttallii* S. Wats. Nuttall's Pea. Fig. 2945.

Lathyrus pubescens Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 274, as a synonym. 1838. Not Hook. & Arn.

Lathyrus Nuttallii S. Wats. Proc. Amer. Acad. 21: 450. 1886.

Lathyrus lanceolatus Howell, Fl. N.W. Amer. 1: 158. 1898.

Perennial, sparingly pubescent, the stems slender, 4-9 dm. high, ascending or erect, branching. Leaflets 6-14, commonly 8, narrowly to broadly elliptic, acute, 2-5 cm. long; stipules small, semisagittate, lanceolate-subulate, entire; tendrils well-developed, slender, simple or divided; peduncles about as long as the leaves, 5-7-flowered; calyx pubescent, the longer lower teeth lanceolate, shorter than the tube; corolla 15 mm. long, the standard bluish purple, the other petals whitish; pods pubescent, narrow, about 3.5 cm. long.

In open woods, Humid Transition Zone; Vancouver Island and western Washington south to northern California and Klamath County, Oregon. Type locality: probably along the lower Columbia River. May-July.

11. *Lathyrus Lanzwertii* Kell. Nevada Pea. Fig. 2946.

Lathyrus Lanzwertii Kell. Proc. Calif. Acad. 2: 150. fig. 44. 1863.

Lathyrus coriaceus White, Bull. Torrey Club 21: 452. 1894.

Lathyrus oregonensis White, Bull. Torrey Club 21: 456. 1894.

Lathyrus Goldsteiniae Eastw. Bull. Torrey Club 32: 197. 1905.

Perennial, sparingly puberulent throughout, the stems rather stout and somewhat climbing, 2-6 dm. high, little or not at all branched. Leaflets 6-12, linear-lanceolate to linear-elliptic, acute or obtuse, firm and coriaceous, strongly veined, 3-5 cm. long; stipules semisagittate, 10-15 mm. long, narrowly lanceolate; tendrils well-developed, forked; peduncles much shorter than the leaves, 4-10-flowered; calyx-teeth unequal, the lower triangular-lanceolate, shorter than the tube; corolla 15 mm. long, the standard bluish purple, the wings often purple-tinged; pod slender, 3 cm. long, glabrous.

Moist ground and thickets, Arid Transition Zone; eastern Washington to western Nevada and the eastern slopes of the Sierra Nevada, California. Type locality: Wasco, Nevada. May-July.

Lathyrus Lanzwertii subsp. *aridus* (Piper) Bradshaw, Bot. Gaz. 80: 247. 1925. (*L. coriaceus* subsp. *aridus* Piper, Proc. Biol. Soc. Wash. 31: 190. 1918.) Leaflets 6 or 8, very rarely only 4, narrowly linear-lanceolate, 4-7 cm. long; tendrils usually simple; corolla about 10 mm. long. Open forest, Arid Transition Zone; Klickitat County, eastern Washington, to the central Sierra Nevada, California. Sierran forms of this have erroneously been referred to *Lathyrus graminifolius* S. Wats.

12. *Lathyrus palustris* L. Marsh Pea or Vetchling. Fig. 2947.

Lathyrus palustris L. Sp. Pl. 733. 1753.

Perennial, glabrous or sparsely pubescent; stems angled and usually winged, slender, 3-8

dm. long. Leaflets 2-3 pairs, linear-lanceolate to oblong, 2-3 cm. long, 3-7 mm. wide, acute or obtuse, mucronate; stipules semisagittate, linear-lanceolate to ovate-lanceolate, 10-15 mm. long; tendrils simple or commonly forked; peduncles about as long as the leaves, 2-6-flowered; lower calyx-teeth about equaling the tube; corolla purple, 10-14 mm. long; pod glabrous, 3.5-5 cm. long, 6 mm. wide.

Moist or wet ground, mainly Boreal Zones; Alaska to northwestern California, along the coast; also along the northern Atlantic coast, and in Eurasia. Type locality: northern Europe. June-Aug.

13. *Lathyrus Watsōnii* White. Watson's or Buff Pea. Fig. 2948.

Lathyrus venosus var. *californicus* S. Wats. Proc. Amer. Acad. 11: 133. 1876.

Lathyrus californicus S. Wats. Proc. Amer. Acad. 20: 363. 1885. Not Dougl. 1828.

Lathyrus Watsonii White, Bull. Torrey Club 21: 447. 1894.

Perennial, rather minutely tomentose, the stems stout, 1-2 m. high, frequently branching, prominently winged on two of the angles. Leaflets ovate to linear-lanceolate, 1-5 cm. long, obtuse or acute, prominently veined, and rather firm; stipules not half the length of the leaflets, commonly toothed at the base, but sometimes narrower and entire; peduncles equaling or exceeding the leaves, 6-15-flowered; calyx tomentose, sometimes sparsely so, the lower teeth longer than the tube; corolla 18-20 mm. long, white, with rose-purple veins; pods 4-7 cm. long, 7-8 mm. wide, veiny, glabrous.

Usually along watercourses, Upper Sonoran and Transition Zones; California, Shasta County to Monterey and Madera Counties. Type locality: Sonoma County. April-June.

14. *Lathyrus Jepsōnii* Greene. Jepson's or Tule Pea. Fig. 2949.

Lathyrus Jepsonii Greene, Pittonia 2: 158. 1890.

Perennial, glabrous or nearly so, the stems stout, 15-30 dm. high, prominently winged on two of the angles. Leaflets 8-12, linear-lanceolate, 3-5 cm. long, acute, prominently veined and coriaceous; tendrils stout, well-developed and divided; stipules semisagittate, entire or toothed toward the base, usually less than half the length of the leaflets; peduncles stout, about equaling the leaves, 6-15-flowered; calyx glabrous or puberulent, the lower teeth equaling the tube; corolla 18-20 mm. long, rose-purple; pod 6-7 cm. long, 1 cm. wide, glabrous, 12-16-seeded.

Low marsh lands, Upper Sonoran Zone; Suisun marshes and the delta islands on the lower Sacramento and San Joaquin rivers, California. Type locality: Suisun marshes. May-June.

15. *Lathyrus sulphureus* Brewer. Brewer's or Snub Pea. Fig. 2950.

Lathyrus sulphureus Brewer ex A. Gray, Proc. Amer. Acad. 7: 399. 1867.

Lathyrus ochropetalus subsp. *holochlorus* Piper, Proc. Biol. Soc. Wash. 31: 190. 1918.

Perennial, glabrous or nearly so, the stems sharply angled or inconspicuously winged, rather slender, 5-10 dm. long. Leaflets 6-12, ovate to ovate-lanceolate, acute, light green on both surfaces, coriaceous; tendrils well-developed; stipules broad, half as long as the leaflets; peduncles usually shorter than the leaves, 6-20-flowered; calyx glabrous, the lower teeth longer than the tube, the upper two very short, triangular; corolla 10-12 mm. long, cream-white turning yellowish brown, the standard with rose-colored veins; pods 6 cm. long, glabrous, 6-7-seeded.

Open places on hillsides, Transition Zones; western Washington to the North Coast Ranges and the southern Sierra Nevada, California. Type locality: "In woods along foothills of the Sierra Nevada," California. April-June.

Lathyrus sulphureus var. *argillaceus* Jepson, Fl. Calif. 2: 393. 1936. Herbage distinctly strigose; corolla 14-15 mm. long; otherwise much as in the typical species. Tehama and Shasta Counties, California. Type locality: Rosewood, Tehama County.

16. *Lathyrus maritimus* (L.) Bigelow. Beach or Sand Pea. Fig. 2951.

Pisum maritimum L. Sp. Pl. 727. 1753.

Lathyrus maritimus Bigelow, Fl. Bost. ed. 2. 268. 1824.

Lathyrus californicus Dougl. ex Lindl. Bot. Reg. 14: pl. 1144. 1828.

Lathyrus pisiformis Hook. Fl. Bor. Amer. 1: 158. 1834.

Perennial, glabrous or very sparingly pubescent, slightly glaucous, the stems stout, decumbent, 25-90 cm. long, angled. Leaflets 8-12, oblong to ovate, acute or obtuse, 1-5 cm. long, rather fleshy; tendrils mostly simple; stipules often nearly as large as the adjacent leaflets, peduncle about equaling the leaves, 6-10-flowered; calyx-teeth unequal, the upper as long as the tube, the three lower longer than the tube; corolla purple, or the keel and wing petals partly white, 20-25 mm. long; pod 4-5 cm. long, sparingly pubescent, 6-8-seeded.

Beach and dune sands along the coast, Boreal Zones; Alaska to Humboldt County, California; also north-eastern North America, Europe, and Asia. Type locality: northern Europe. May-July. The American plants are considered by some as *L. maritimus* var. *glaber* (Ser.) Eames, Rhodora 11: 95. 1909.

17. *Lathyrus polyphyllus* Nutt. Many-leaved or Oregon Pea. Fig. 2952.

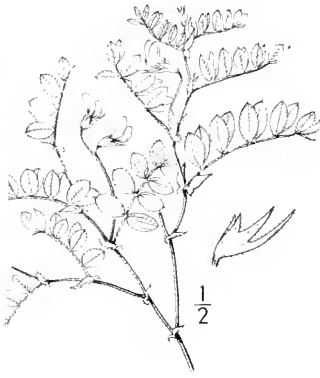
Lathyrus polyphyllus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 274. 1838.

Perennial, glabrous, the stems stout, angled, erect and climbing, 7-10 dm. high. Leaflets 10-20, petiolulate, oblong-elliptic to ovate, 2-5 cm. long, obtuse, rather thin, paler beneath; tendrils small, branched; stipules broad, nearly as large as the leaflets, more or less dentate; peduncles shorter than the leaves, 5-10-flowered; calyx-teeth ciliate on the margins, the lower subulate, shorter than the tube; corolla purple, 15-18 mm. long; pods 4-6 cm. long, 6-7 mm. wide.

Coniferous forests, Humid Transition Zone; British Columbia south along the Pacific slope to the North Coast Ranges, California. Type locality: "Forests of the Oregon toward the sea." May-June.



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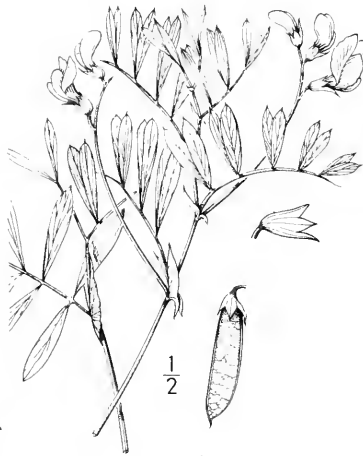
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2939. *Lathyrus littoralis*
2940. *Lathyrus Torreyi*
2941. *Lathyrus Cusickii*

2942. *Lathyrus bijugatus*
2943. *Lathyrus rigidus*
2944. *Lathyrus nevadensis*

2945. *Lathyrus Nuttallii*
2946. *Lathyrus Lanszwertii*
2947. *Lathyrus palustris*



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2948. *Lathyrus Watsonii*
2949. *Lathyrus Jepsonii*
2950. *Lathyrus sulphureus*

2951. *Lathyrus maritimus*
2952. *Lathyrus polyphyllus*
2953. *Lathyrus pauciflorus*

2954. *Lathyrus Schaffneri*
2955. *Lathyrus vestitus*
2956. *Lathyrus Bolanderi*

18. *Lathyrus pauciflorus* Fernald. Few-flowered or Brush Pea. Fig. 2953.

Lathyrus pauciflorus Fernald, Bot. Gaz. 19: 335. 1894.

Lathyrus Bradfieldianus A. Nels. Bot. Gaz. 54: 411. 1912.

Perennial, glabrous throughout, 6–9 dm. high, the stems angled, rather stout. Leaflets 6–12, oblong-elliptic to oblong-lanceolate, acute, 2–4 cm. long, prominently veined; stipules about half as large as the adjacent leaflets, entire or dentate on the lower auricle; tendrils simple or branched; peduncles equaling or exceeding the leaves, 3–7-flowered; calyx-teeth sparsely pubescent, the lower about as long as the tube; corolla 20–24 mm. long, violet; pods narrow, 3–5 cm. long, glabrous.

Open woods, Humid and Arid Transition Zones; Vancouver Island to western Oregon, east to Idaho. Type locality: Alмота, Washington. April–June.

Lathyrus pauciflorus subsp. *utahensis* (M. E. Jones) Piper, Proc. Biol. Soc. Wash. 31: 194. 1918. Leaflets oval to ovate, obtuse. Eastern Washington and eastern Oregon to Colorado, Utah, and Arizona.

Lathyrus pauciflorus subsp. *tenuior* Piper, Contr. U.S. Nat. Herb. 11: 378. 1906. Leaflets linear-lanceolate, 3–6 cm. long; stipules nearly as wide as the leaves, but not half as long. Eastern Washington and Idaho.

19. *Lathyrus Schaffneri* Rydb. Schaffner's Pea. Fig. 2954.

Lathyrus parvifolius S. Wats. Proc. Amer. Acad. 17: 345. 1882. Not Roth.

Lathyrus Schaffneri Rydb. Mem. N.Y. Bot. Gard. 1: 258. 1900.

Lathyrus ecirrhosus Heller, Muhlenbergia 1: 54. 1904.

Lathyrus pauciflorus subsp. *Schaffneri* Piper, Proc. Biol. Soc. Wash. 31: 194. 1918.

Perennial, glabrous, the stems rather stout, angled, erect or decumbent, 2–6 dm. long. Leaflets 8–16, oval or elliptic, or sometimes narrowly elliptic, 1–3 cm. long, thick and prominently nerved; peduncles mostly exceeding the leaves, 6–12-flowered; calyx-teeth glabrous or sparingly pubescent on the margins, the lower shorter than the tube; corolla about 12–15 mm. long, violet-purple, or the wings and keel yellowish toward the base; pod 25–35 mm. long, glabrous.

Open coniferous forests, Arid Transition Zone; eastern Oregon south to the North Coast Ranges, the Sierra Nevada and Tehachapi Mountains, California, east to Utah, and northern Mexico. Type locality: San Miguelito Mountains, San Luis Potosi, Mexico. April–June.

20. *Lathyrus vestitus* Nutt. Common Pacific Pea. Fig. 2955.

Lathyrus vestitus Nutt. in Torr. & Gray, N. Amer. Fl. 1: 276. 1838.

Lathyrus puberulus White ex Greene, Man. Bay. Reg. 85. 1894.

Lathyrus quercetorum Heller, Muhlenbergia 2: 290. 1907.

Perennial, low and herbaceous or often 1–3 m. high, climbing over shrubs, woody at base, more or less pubescent with somewhat appressed kinky hairs. Leaflets 8–14, ovate-oblong to linear, cuspidate, rather firm, 15–30 mm. long, stipules semisagittate, less than half the size of the leaflets, entire or few-toothed on the lower lobe; peduncles about equaling the leaves, 4–12-flowered; calyx pubescent, the lower teeth lanceolate, equaling the tube; corolla 15 mm. long, standard purple-veined, the petals otherwise white; pod 4–6 cm. long, appressed-pubescent.

Growing on open grassy slopes, or among shrubs, Upper Sonoran and Humid Transition Zones; western Oregon to the Coast Ranges of central California. Type locality: "Plains of the Oregon [Columbia River] toward the sea." Feb.–June.

Lathyrus vestitus subsp. *violaceus* (Greene) Abrams. (*Lathyrus violaceus* Greene, Erythea 1: 105. 1893.) Closely resembling the typical species in general habit, pubescence, and size and shape of petals and calyx-lobes, distinguished only by the violet-purple standard petals. In recent California manuals it has been confused with *L. Alfeldii* White (*L. strictus* Nutt.), but that has larger flowers, with very different shaped keel-petals and different calyx-lobes. California Coast Ranges from Monterey to Los Angeles County. *Lathyrus violaceus* var. *barbarae* White is a narrow-leaved form of this subspecies.

21. *Lathyrus Bolanderi* S. Wats. Bolander's Pea. Fig. 2956.

Lathyrus Bolanderi S. Wats. Proc. Amer. Acad. 20: 363. 1885.

Perennial, the stems stout, often with a narrow winged margin on the angles, 6–10 dm. high, erect or climbing. Leaflets 8–12, ovate to ovate-lanceolate, 2–5 cm. long, prominently mucronulate, rather thin, paler beneath; tendrils slender, usually with several forks; stipules about half the size of the leaflets, usually toothed below; peduncles as long as or sometimes well exceeding the leaves, usually many-flowered; calyx glabrous to rarely sparsely pubescent, the lowest lobe usually exceeding the tube, lateral lobes lanceolate, about equaling the tube; corolla purple or nearly white and purple-veined, 15 mm. long; pods 4 cm. long, glabrous or sometimes with minute brownish glands.

Hillides and open woods, mainly Humid Transition Zone; Coast Ranges of southern Oregon to central California. Type locality: "Oakland Hills, Oakland, California." April–June.

22. *Lathyrus laetiflorus* Greene. San Gabriel or Canyon Pea. Fig. 2957.

Lathyrus laetiflorus Greene, Erythea 1: 105. 1893.

Perennial, puberulent or rarely glabrous, the stems stout, climbing, 1–3 m. high, branching. Leaflets 6–12, oblong to ovate, obtuse or acute, 1–5 cm. long, firm and coriaceous, veiny; tendrils well developed, divided; stipules small, not half the size of the adjoining leaflet, commonly toothed; peduncles stout, frequently twice the length of the leaves, 5–12-flowered; calyx-teeth very unequal, the upper triangular, the two lateral lanceolate-subulate, scarcely equaling the

tube, the lowest one narrowly subulate, longer than the tube; corolla 2 cm. long, cream or faintly flesh-colored, the banner rose-veined; pods 4-5 cm. long, many-seeded.

Growing over bushes, Upper Sonoran Zone; southern California in the cismontane region from the Santa Monica to the San Jacinto Mountains. April-May.

23. *Lathyrus Alefeldii* White. San Diego Pea. Fig. 2958.

Lathyrus strictus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 276. 1838. Not Grauer, 1784.

Lathyrus Alefeldii White, Bull. Torrey Club 21: 449. 1894.

Perennial, sparingly puberulent with somewhat kinky hair, the stems ribbed on the angles, rather stout, often climbing, 1-2 m. high. Leaflets 6-10, usually alternating, linear-lanceolate to ovate-elliptic, acute or obtuse, 1-4 cm. long, firm-coriaceous, and veiny; peduncles stout, usually well surpassing the leaves, 6-10-flowered; pedicels 8-10 mm. long; calyx pubescent, the upper lobes short-triangular, the two lateral lanceolate-subulate, and the lowest one narrowly subulate, shorter than the tube; corolla rose-purple to rose-red, 20-25 mm. long, the banner broadly obcordate, nearly as broad as long.

On chaparral slopes, Upper Sonoran Zone; western Riverside and Orange Counties, California, south to northern Lower California; also on San Clemente and Santa Catalina Islands. Type locality: San Diego, California. March-May.

24. *Lathyrus splendens* Kell. Campo Pea. Fig. 2959.

Lathyrus splendens Kell. Proc. Calif. Acad. 7: 90. 1876.

Perennial, the stems merely angled, climbing, 1-2 m. high. Leaflets 6-8, elliptic-ovate to linear-lanceolate, 2-5 cm. long, veiny and coriaceous, pale green on both surfaces; tendrils well developed, divided; stipules scarcely half the length of the leaflets, rather narrow and entire or sometimes toothed toward the base; peduncles stout, usually well exceeding the leaves, 4-12-flowered; calyx-teeth thinly pubescent, the lower lobes narrowly lanceolate, shorter than the tube; corolla deep red, 25-35 mm. long; the standard strongly reflexed; pod glabrous, 6-7 cm. long, 1 cm. wide, 12-16-seeded.

Hillsides, Upper Sonoran Zone; San Diego County, California, south to northern Lower California. Type locality: southern California. April-June.

Family 70. KRAMERIACEAE.

KRAMERIA FAMILY.

Shrubs or perennial herbs, with alternate, simple and entire or rarely 3-foliolate leaves. Flowers irregular, rather large, commonly purple, axillary or racemose. Peduncles usually bearing 2 opposite foliaceous bracts. Calyx of 4 or 5 unequal sepals. Petals 5, unequal, the three upper ones long-clawed, distinct or partly united, the 2 lower much smaller, sessile, rather thick and fleshy. Stamens 4, free or borne on the claws of the upper petals; anthers 2-celled, opening by a terminal pore. Style slender, elongated, acute. Ovary 1-celled; ovules 2, pendulous, anatropous. Fruit globose, indehiscent, spiny, 1-seeded. Seeds without endosperm; embryo with thick cotyledons.

The family comprises the single genus, *Krameria*, and about 20 species.

1. *KRAMERIA* [Loeff.] L. Sp. Pl. ed. 2. 177. 1762. [Name in honor of

J. G. H. Kramer, Austrian botanist and physician of the 18th century.]

An American genus of about 20 species. Type species, *Krameria Ixina* L.

Claws of the upper petals distinct; spines of the fruit barbed only at apex.

1. *K. Grayi*.

Claws of the upper petals united; spines of the fruit barbed along their sides or barbless.

Peduncles and outer sepals stipitate-glandular.

2. *K. glandulosa*.

Peduncles and sepals not glandular.

3. *K. imparata*.

1. *Krameria Grayi* Rose & Painter. White Ratany. Fig. 2960.

Krameria canescens A. Gray, Pl. Wright, 1: 42. 1852. Not Willd. 1825.

Krameria Grayi Rose & Painter, Contr. U.S. Nat. Herb. 10: 108. 1906.

Low much branched spinescent shrub, 3-6 dm. high, the twigs densely canescent with a short appressed pubescence. Leaves linear, 8-20 mm. long, mostly 1.5-2 mm. wide, acute or acuminate at apex, narrowed below to the sessile base, densely canescent; peduncles solitary in the axils, 15-25 mm. long, bearing two foliaceous bracts above the middle; sepals 8-10 mm. long, canescent without, nearly glabrous and purplish within; upper petals distinct, spatulate, 4-5 mm. long; lower petals much shorter, cuneate-obovate, truncate or emarginate; fruit 5-7 mm. in diameter, densely canescent; prickles armed at apex with 2-4 rather prominent retrorse barbs.

Dry rocky ridges, Lower Sonoran Zone; Mojave Desert, southern California, eastward to southern Nevada and western Texas, south to Lower California and northern Mexico. Type locality: prairies, near Pecos, Texas. April-May.

2. *Krameria glandulosa* Rose & Painter. Glandular Ratany. Fig. 2961.

Krameria glandulosa Rose & Painter, Contr. U.S. Nat. Herb. 10: 108. 1906.

Krameria parvifolia var. *glandulosa* J. F. Macbride, Contr. Gray Herb. No. 56: 52. 1918.

Low much branched shrub resembling the preceding species in general habit, young twigs and peduncles somewhat less canescent and beset with stipitate glands. Leaves very narrowly linear to almost subulate, mostly less than 1 mm. wide, 5–10 mm. long, canescent; calyx rather sparsely canescent; upper petals united below, the middle lobe oblong, the lateral obliquely ovate, the lower cuneate-obovate, about 3 mm. long; body of the fruit 6–7 mm. broad, rather densely canescent, the slender prickles with a few inconspicuous barbs along the sides below the naked apex.

Rocky ridges and slopes, Lower Sonoran Zone; Mojave and Colorado Deserts, California, east to southern Nevada and western Texas. Type locality: El Paso, Texas. April–June. Heart-nut.

3. *Krameria imparata* (J. F. Macbride) Britt. Pima Ratany. Fig. 2962.

Krameria parvifolia var. *imparata* J. F. Macbride. Contr. Gray Herb. No. 56: 52. 1918.

Krameria imparata Britt. N. Amer. Fl. 23: 199. 1930.

Closely resembling the preceding species, but more densely sericeous and not glandular. Leaves narrowly linear, sessile, acute or obtuse, 2–12 mm. long; peduncles 15 mm. long or less; sepals sericeous, 6–11 mm. long; upper petals united below, 4 mm. long, the middle lobe oblong, the lateral obliquely ovate; lower petals cuneate-obovate, truncate, 2.5 mm. long; stamens united to the claw of the petals; body of the fruit densely strigose, the prickles barbed on the sides below the apex to about the middle.

Rocky desert ridges and slopes, Lower Sonoran Zone; Mojave Desert, southern California, to southern Nevada, south to Sonora and Lower California. Type locality: Mountain Springs, California. March–May.



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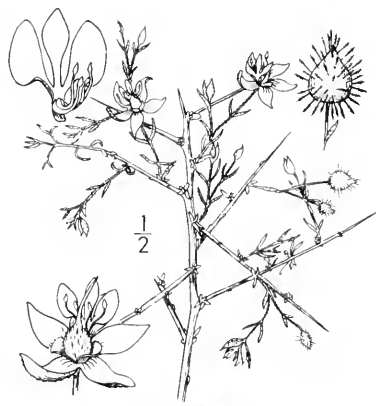
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2957. *Lathyrus laetiflorus*
2958. *Lathyrus Alefeldii*

2959. *Lathyrus splendens*
2960. *Krameria Grayi*

2961. *Krameria glandulosa*
2962. *Krameria imparata*

APPENDIX

NEW SPECIES, SUBSPECIES, AND VARIETIES FROM THE PACIFIC STATES DESCRIBED IN 1938-1943

The manuscript for this volume was closed and submitted to the printers in 1938 and has been in type since 1939 and early 1940. Since then a number of species, subspecies, and varieties have been described. Without attempting to evaluate these new proposals we are appending a bibliographical list including the type localities.

POLYGONACEAE

- Chorizanthe Thurberi* var. *macrotheca* J. T. Howell, Leaflets West. Bot. 3: 205. 1943. Alcalde, Monterey County, California.
Chorizanthe ventricosa Goodman, op. cit. 2: 193. fig. 1, 2. 1939. Between San Lucas and Priest Valley, Monterey County, California.
Eriogonum caespitosum subsp. *Douglasii* var. *sublineare* Stokes, op. cit. 2: 72. 1938. Ellensburg, Kittitas County, Washington.
Eriogonum effusum var. *limbatum* Stokes, op. cit. 3: 15. 1941. Pinyon Mesa, Panamint Mountains, Inyo County, California.
Eriogonum fulvum Stokes, op. cit. 3: 200. 1943. Bickleton, Klickitat County, Washington.
Eriogonum Gilmani Stokes, op. cit. 3: 16. 1941. Pinyon Mesa, Panamint Mountains, Inyo County, California.
Eriogonum Hoffmannii var. *robustius* Stokes, loc. cit. Ryan Wash, Funeral Mountains, Inyo County, California.
Eriogonum pratense Stokes, loc. cit. Cottonwood Creek, Sierra Nevada, Inyo County, California.
Eriogonum nodosum subsp. *monoense* Stokes, op. cit. 3: 201. 1943. Sherwin Grade, Mono County, California.
Eriogonum pratense Stokes, loc. cit. Cottonwood Creek, Sierra Nevada, Inyo County, California.
Eriogonum racemosum var. *desertorum* Stokes, op. cit. 3: 17. 1941. Arcane Meadow, Panamint Mountains, Inyo County, California.
Polygonum montereyense Brenckle, op. cit. 3: 166. 1942. Monterey, Monterey County, California.

NYCTAGINACEAE

- Mirabilis laevis* var. *cordifolia* Dunkle, Bull. S. Calif. Acad. 40: 108. 1941. San Clemente Island, California.

PORTULACACEAE

- Lewisia Cantelovii* J. T. Howell, Leaflets West. Bot. 3: 139. 1942. Near Belden, Plumas County, California.
Spraguea pulcherrima Heller, op. cit. 2: 219. 1940. Feather River, Plumas County, California.

CARYOPHYLLACEAE

- Silene Andersonii* Clokey, Bull. S. Calif. Acad. 38: 2. 1939. Charleston Mountains, Nevada, and eastern San Bernardino County, California.

RANUNCULACEAE

- Aquilegia fontinalis* J. T. Howell, Leaflets West. Bot. 2: 254. 1940. San Luis Range, San Luis Obispo County, California.
Delphinium antoninum Eastw. op. cit. 3: 126. 1942. Anthony Peak, between Mendocino and Tehama Counties, California.
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- Lupinus Pennellianus* Heller ex Eastw. op. cit. 3: 42. 1941. Between Pulga and Arch Rock Tunnel, Butte County, California.
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